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HOSPITAL AND HEALTH DEPARTMENT FACILITIES AND NEEDS IN TENNESSEE



TENNESSEE DEPARTMENT OF PUBLIC HEALTH

NASHVILLE, TENNESSEE

1948

HOSPITAL AND HEALTH DEPARTMENT
FACILITIES AND NEEDS IN TENNESSEE



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FOREWORD

Early in 1945 the Tennessee Department of Public Health realized that federal funds might be made available in the near future for hospital construction. The Commission on Hospital Care, a non-government public service committee to study hospital service in the United States, had been established in 1944 by the American Hospital Association. This Commission had conducted a pilot study in Michigan for the purpose of developing forms and procedures suitable for use in other states. The work of this group was known and their advice was obtained in developing plans for a survey of existing facilities in Tennessee, a necessary step in planning for hospital construction.

After consultation with Governor Jim McCord the State Department of Public Health was designated by executive order as the State Agency to make or have made a hospital survey for Tennessee. A contract was made with the Tennessee Hospital Association, Incorporated, for a detailed survey of hospital facilities within the state utilizing the forms known as *Hospital Schedules of Information* and *Public Health Department Facilities Schedules of Information* prepared by the Commission on Hospital Care of the American Hospital Association. A Survey Committee of the Tennessee Hospital Association was appointed with the following persons serving on the committee:

T. H. Haynes, Knoxville, Chairman
C. E. Thompson, Memphis
H. H. Miller, Nashville
H. G. Ramsey, Memphis

Mr. W. N. Walters was appointed director of the survey and a staff was obtained to assist in the conduct of the survey. Mrs. Ruth Ray rendered statistical assistance in collection and assembly of data. The survey was started in November, 1945 and was completed July 1, 1946.

The completed schedules of information regarding hospitals and health facilities were sent to the Commission on Hospital Care for processing. Tabulations of hospital schedule data were prepared and returned to Tennessee in September, 1946 for use in the report of hospital facilities.

The Director of Statistical Service of the Tennessee Department of Public Health, Dr. Ruth R. Puffer, served as a consultant throughout the survey and was given the responsibility for analysis of the data and preparation of the material for publication.

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Tennessee Public Acts of 1947, Chapter 16, authorized the establishment of the Division of Hospital Survey and Construction in the Tennessee Department of Public Health. This division was created and Dr. C. C. Demmer was appointed director of the division on February 10, 1947. He has taken charge of this program and has developed an integrated plan for construction of hospital and health department facilities. The Public Acts of 1947 also authorized the appointment of an Advisory Hospital Committee to advise and consult with the Department of Health in carrying out the administration of this Act. The members of this committee are given on page v.

The first four chapters of this report were released prior to the first meeting of the Advisory Hospital Committee on September 4, 1947. The plan for development of hospitals and health department facilities as given in Chapter V was presented to the Committee on that date. This report of *Hospitals and Health Department Facilities and Needs in Tennessee* received the approval of the Advisory Committee.

This report provides the basic data used in developing the present plan for hospital and health department facilities. It is realized that changes will need to be made from time to time in developing these services for the population of Tennessee. Annual revisions of the plan will be made to take account of changing conditions.

The contributions of the many agencies and individuals involved in the survey, in processing and analyzing data and in the preparation of the plan, are acknowledged. It is believed that an outstanding step has been taken for the development of hospital and health department facilities for the population of Tennessee.

ROBERT H. HUTCHESON
Chairman, Advisory Hospital Committee
Commissioner, Tennessee Department of
Public Health

November 1, 1947

MEMBERS OF ADVISORY HOSPITAL COMMITTEE

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C. E. Brehm, Acting President, University of Tennessee, Knoxville

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T. H. Haynes, representing Tennessee Hospital Association, Knoxville

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Maxey Jarman, President, General Shoe Corporation, representing Manufacturers' Association,
Nashville

Hayden B. Johnson, Executive Director, Tennessee State Planning Commission, Nashville

Gilbert King, representing Pharmacy, Chattanooga

Mrs. W. W. McCallum, representing the Parent-Teacher Association, Henderson

Henry H. Miller, representing the Tennessee Hospital Association, Nashville

L. F. Mitchell, Ph.G., Secretary, Tennessee Public Health Council, Nashville

Oren A. Oliver, D.D.S., Chairman, Tennessee Public Health Council, Nashville

Mrs. Ferdinand Powell, Member, Tennessee Public Health Council, Johnson City

T. R. Ray, M.D., Member, Tennessee Public Health Council, Shelbyville

George D. Roberts, Blount County Judge, representing Tennessee County Judges' Association, Maryville

W. L. Rucks, M.D., Member, Public Health Council, Memphis

Lee Sanders, President, Nashville Trades and Labor Council, Nashville

William A. Shoaf, Commissioner, Tennessee Department of Public Welfare, Nashville

J. M. Smith, President, Memphis State College, Memphis

J. R. Thompson, Jr., M.D., Member, Tennessee Public Health Council, Jackson

R. B. Wood, M.D., Member, Tennessee Public Health Council, Knoxville

Nina E. Wootton, R.N., representing Tennessee Nurses Association, Nashville

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HOSPITAL AND HEALTH DEPARTMENT FACILITIES AND NEEDS IN TENNESSEE

I. SURVEY OF HOSPITAL FACILITIES IN TENNESSEE

A state-wide inventory of hospital and public health facilities was undertaken in November, 1945, to determine the needs of the entire state. A hospital survey committee was appointed and a staff to carry on the survey was employed. The survey committee and staff cooperated with the Commission on Hospital Care sponsored by the American Hospital Association, a non-government public service committee for the study of hospital service in the United States.

The schedules of information regarding hospital and public health department facilities prepared by the Commission on Hospital Care were used in Tennessee for recording of information. An effort was made to include all except federal hospitals; in addition to the hospitals and related institutions listed in "Hospital Service in the United States," published by the American Medical Association, local officials were requested to supply information regarding hospitals. The schedules were sent out to hospitals providing bed care for the sick. The director and members of the survey staff visited the hospitals and rendered assistance to them in the completion of schedules. The completed schedules were sent to the Commission on Hospital Care for processing. Tabulations of schedule data were prepared and returned to Tennessee for use in a report of hospital facilities.

In the present report, selected data from the survey of hospital facilities have been used to show the amount and type of hospital service available to the population of Tennessee.

In the 1945 edition of "Hospital Service in the United States", published by the American Medical Association, there were 111 hospitals and related institutions listed for Tennessee in 1944. Of these 111 hospitals and related institutions, 97 were included in the hospital survey and 14 were excluded. The reasons for exclusion of these

hospitals* with the number of beds excluded are given in Table I.

TABLE I

NUMBER OF HOSPITALS AND BEDS LISTED BY
AMERICAN MEDICAL ASSOCIATION ACCORDING TO
INCLUSION AND EXCLUSION IN HOSPITAL SURVEY

REASON FOR EXCLUSION	HOSPITALS	BEDS
NUMBER LISTED BY AM. MED. ASSN.	111	19,866
NUMBER INCLUDED IN SURVEY	97	14,328
NUMBER EXCLUDED FROM SURVEY	14	5,538
FEDERAL HOSPITALS	5	3,148
INSTITUTIONS FOR DOMICILIARY CARE	4	2,272
HOSPITALS IN INSTITUTIONS	2	52
DATA NOT OBTAINED (UNCOOPERATIVE)	2	26
CLOSED	1	40

For the 97 hospitals listed by American Medical Association and included in the survey there were 14,328 beds. Fourteen other hospitals with 5,538 beds were excluded. These included five federal hospitals which serve only a selected group, four institutions for domiciliary care, and two hospitals included as parts of institutions. Data were not obtained from two small hospitals with twenty-six beds. One hospital was closed at the time of the survey.

Although there were 14,328 beds listed by the American Medical Association for the 97 hospitals, on the basis of the "bed complement" that is the number of beds actually set up and in use at the time of the survey these same hospitals had 14,028 beds. In this report, the number of beds will refer to bed complement. The data given for bed

* Hospitals and related institutions are termed "hospitals" in this report.

complement were more complete and accurate than for bed capacity. In addition to these 97 hospitals, 48 others with 1,059 beds which were not listed by the American Medical Association were included. A few of these were new hospitals which were not in operation in 1944. The total number of hospitals included in the survey was 145 with 15,087 beds.

In addition to these 145 hospitals included in the survey, there were small hospitals and clinics with a few beds which have not been included. The total number of beds in these small hospitals and clinics was not large. One large known hospital in Oak Ridge in Anderson County was not included in the survey. This hospital has served a restricted population group in this in-

dustrial community in which work on the atomic bomb was carried on.

A. HOSPITALS AND HOSPITAL BEDS ACCORDING TO TYPE OF SERVICE AND SIZE

On the basis of the population of Tennessee in 1944 (3,045,345), there were 5.0 hospital beds per 1,000 population. The 101 general hospitals had 6,229 beds or 2.0 per 1,000 population. The number of hospital beds for nervous and mental patients (6,748) was slightly larger than the number of general hospital beds. There were 1,091 beds in tuberculosis hospitals, or 0.4 per 1,000 population. The remaining 1,019 hospital beds in 28 hospitals were for special services (Table II). In the remainder of the report, they will be included in the group "other special."

TABLE II

NUMBER OF HOSPITALS AND BEDS, WITH BEDS PER 1,000 POPULATION ACCORDING TO TYPE OF SERVICE

TYPE OF SERVICE	HOSPITALS		BEDS		PER 1,000 POPULATION
	NUMBER	PER CENT	NUMBER	PER CENT	
TOTAL	145	100.0	15,087	99.9	5.0
GENERAL	101	69.7	6,229	41.3	2.0
NERVOUS AND MENTAL	9	6.2	6,748	44.7	2.2
TUBERCULOSIS	7	4.8	1,091	7.2	0.4
MATERNITY	1	0.7	17	0.1	*
CHILDREN	1	0.7	99	0.7	*
ORTHOPEDIC	5	3.4	213	1.4	0.1
EYE, EAR, NOSE, AND THROAT	7	4.8	149	1.0	*
CHRONIC AND CONVALESCENT	10	6.9	259	1.7	0.1
ALCOHOLIC	2	1.4	34	0.2	*
VENEREAL DISEASE	2	1.4	248	1.6	0.1

* LESS THAN 0.05 BEDS PER 1,000 POPULATION

Only 25 hospitals had 100 or more beds; 17 had 50 - 99 beds; and the remaining 103, or 71 per cent, had less than 50

hospital beds. The number of hospitals and beds according to size and type of service is given in Table III.

TABLE III

NUMBER OF HOSPITALS AND BEDS ACCORDING TO SIZE
AND TYPE OF SERVICE

SIZE	TOTAL		GENERAL		NERVOUS AND MENTAL		TUBERCULOSIS		OTHER SPECIAL	
	HOS- PITALS	BEDS	HOS- PITALS	BEDS	HOS- PITALS	BEDS	HOS- PITALS	BEDS	HOS- PITALS	BEDS
TOTAL	145	15,087	101	6,229	9	6,748	7	1,091	28	1,019
UNDER 25 BEDS	61	918	46	708	-	-	-	-	15	210
25 - 49 BEDS	42	1,433	30	1,005	4	160	2	72	6	196
50 - 99 BEDS	17	1,044	10	575	1	50	1	54	5	365
100 - 249 BEDS	13	2,187	7	1,119	1	230	3	590	2	248
250 - 499 BEDS	9	3,197	8	2,822	-	-	1	375	-	-
500 BEDS AND OVER	3	6,308	-	-	3	6,308	-	-	-	-

Of the 25 hospitals with 100 or more beds, 15 were general hospitals, four were nervous and mental hospitals, four were tuberculosis and two were venereal disease hospitals.

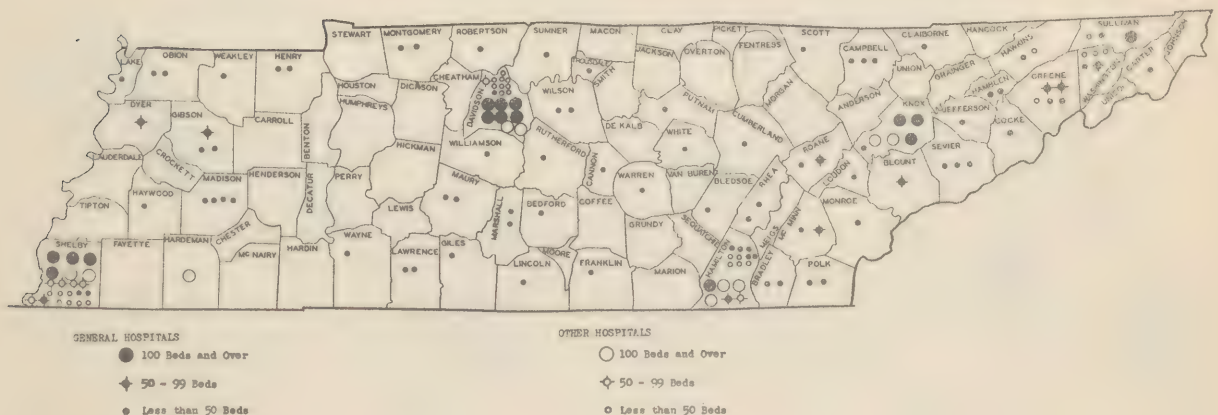
B. DISTRIBUTION OF HOSPITALS IN TENNESSEE

The distribution of the 101 general hospitals and 44 other hospitals was studied and related to the population of counties and of sections of the state. In

Figure 1 the numbers of hospitals according to size are shown by counties. All but two of the hospitals with 100 beds or more were located in the large city-counties of Davidson, Hamilton, Knox and Shelby. Of the 17 hospitals with 50-99 beds, nine were located in the four large city-counties and eight in smaller counties (Blount, Dyer, Gibson, Green (2), McMinn, Roane and Washington). The remaining small hospitals (103) were found in 51 counties. Forty-one counties had no hospitals.

FIGURE 1

DISTRIBUTION OF 101 GENERAL HOSPITALS AND 44 OTHER HOSPITALS
ACCORDING TO SIZE BY COUNTIES OF TENNESSEE

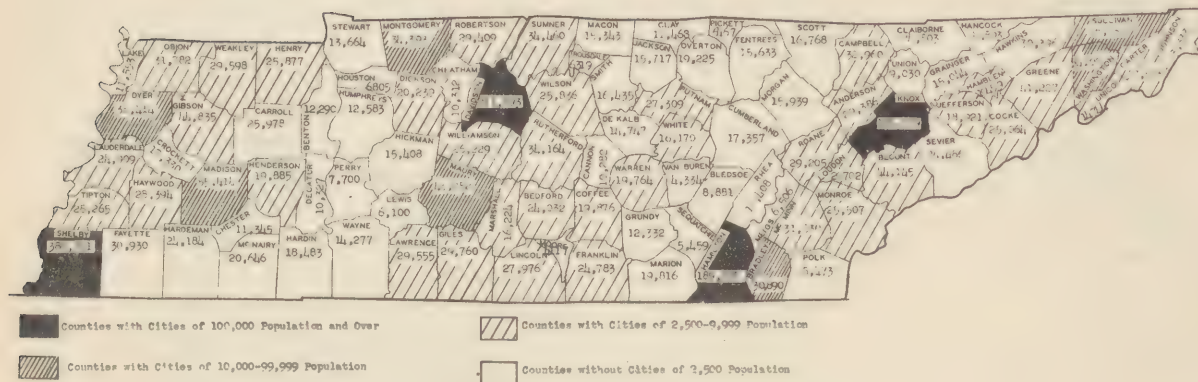


In Figure 2, the estimated population for 1944 and the urban character of each county are given. In addition to the four large counties with cities of 100,000 population and over, there are seven counties

with cities of 10,000 - 30,000 and 37 others with cities of 2,500 but less than 10,000 population. The remaining 47 counties have no cities with as many as 2,500 people.

FIGURE 2

ESTIMATED POPULATION OF COUNTIES IN 1944 AND
URBAN CHARACTER OF COUNTIES OF TENNESSEE



GENERAL HOSPITALS - In Figures 3, 4, 5, and 6, the distribution of general hospital beds is shown. In Figure 3, the reported

number of general hospital beds by counties is given. In only seven counties were there more than 100 beds; in 12 counties there were 50 - 99 beds.

FIGURE 3

DISTRIBUTION OF GENERAL HOSPITAL BEDS, BY COUNTIES OF TENNESSEE



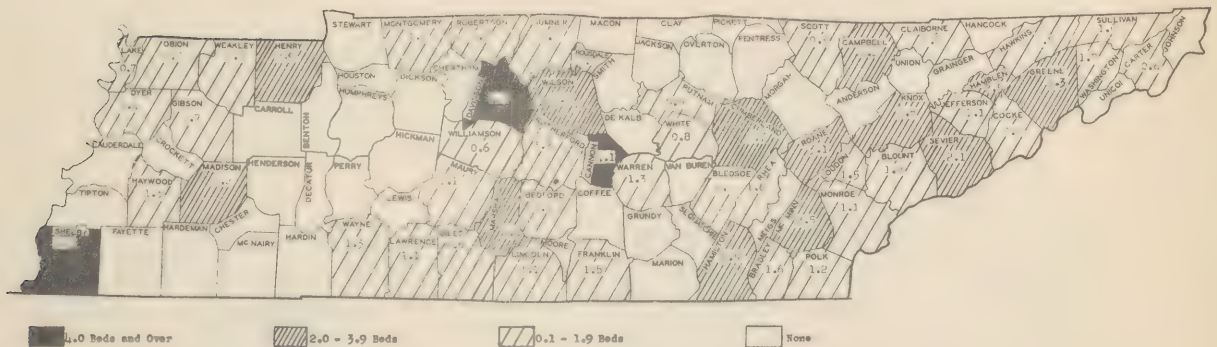
In Figure 4, the number of general hospital beds per 1,000 population is shown for the counties. For the State as a whole, there were 6,229 general hospital beds or 2.0 per 1,000 population. This is far below the recommended figure of 4.5 per 1,000 population. In accordance with the Hospital Survey and Construction Act, (Public Law 725, 79th Congress), 4.5 beds per 1,000 population are recommended. In that program, the standard for base areas would be 4.5 per 1,000 population, for intermediate areas, 4.0 per 1,000 population and for rural areas, 2.5 per 1,000 population. A base area is defined as an area with a teaching hospital of a medical school or an area with at least 100,000 population and one general hospital with complement of 200 or more beds for general use. An intermediate area has a population of at least 25,000, and on completion of hospital construction program would have at least one general hospital of 100 beds suitable for use as a district hospital in a coordinated hospital system. A rural area is the re-

maining area, no part of which is included in a base or intermediate area. In only the three counties of Davidson, Shelby and Cannon were there as many as 4.0 beds per 1,000 population. Davidson and Shelby have hospital centers serving large areas; in fact, the hospitals of Davidson County are used by residents of nearly all the counties of Middle Tennessee. Memphis is the hospital center for West Tennessee and for the surrounding area of Arkansas and Mississippi. Cannon County, the other county with over 4.0 beds per 1,000 population, has one general hospital in Woodbury with 42 beds. There were only 13 other counties with 2.0 - 3.9 beds per 1,000 population. These counties with beds per 1,000 population are given below:

Campbell	2.2	Henry	2.0	Roane	3.1
Cumberland	2.7	Knox	3.8	Sevier	2.1
Greene	3.3	McMinn	2.5	Wilson	2.3
Hamblen	2.5	Madison	2.2		
Hamilton	2.8	Marshall	2.4		

FIGURE 4

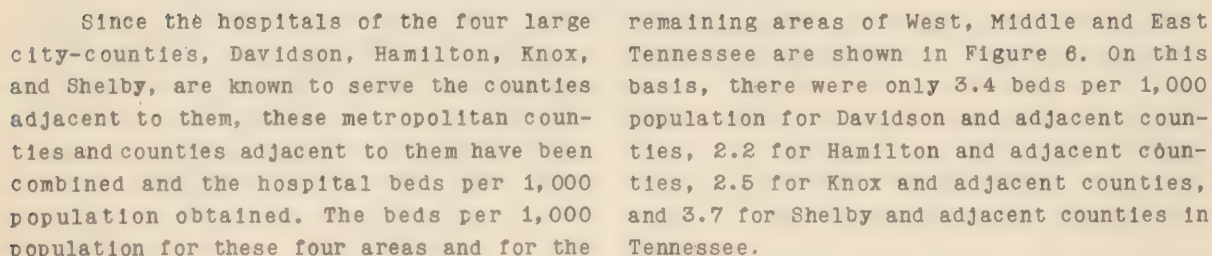
GENERAL HOSPITAL BEDS PER 1,000 POPULATION BY COUNTIES OF TENNESSEE



For consideration of the problem by sections of Tennessee, the state, excluding the four large city-counties, has been divided into six sections with each of the three main sections, East, Middle and West, divided into two sections (Figure 5). For

the four areas in Middle and West Tennessee, outside of Davidson and Shelby Counties, there were only 0.8 beds per 1,000 population. In East Tennessee there were 1.3 beds in the Eastern section and 1.5 in the section between Knox and Hamilton.

GENERAL HOSPITAL BEDS PER 1,000 POPULATION FOR FOUR LARGE CITY COUNTIES
AND SIX SUBDIVISIONS OF TENNESSEE



GENERAL HOSPITAL BEDS PER 1,000 POPULATION IN METROPOLITAN
AND ADJACENT COUNTIES BY SECTIONS OF TENNESSEE



NERVOUS AND MENTAL HOSPITALS - There were nine hospitals for nervous and mental patients in Tennessee with 6,748 beds (Table IV). The three large state hospitals, one in Middle Tennessee (Davidson County) with 2,000 beds, one in East Tennessee (Knox County) with 1,850 beds and one in West Tennessee (Hardeman County) with 2,458 beds, had 93 per cent of the hospital beds in nervous and mental hospitals. In addition to these three large hospitals, there were two other governmental and five proprietary hospitals for nervous and mental patients.

TABLE IV

NUMBER OF NERVOUS AND MENTAL HOSPITALS
AND BEDS BY COUNTIES

COUNTY	HOSPITALS	BEDS
STATE	9	6,748
DAVIDSON	2	2,045
HAMILTON	1	230
HARDEMAN	1	2,458
KNOX	1	1,850
SHELBY	4	165

The recommended ratio of beds in mental hospitals is 5 per 1,000 population. This is slightly more than twice as many as Tennessee has at present, 2.2 per 1,000 population.

TUBERCULOSIS HOSPITALS - The seven tuberculosis hospitals* in Tennessee had 1,091 beds, or 0.4 per 1,000 population. Two small hospitals, one in Davidson County with 54 beds and one in Greene County with 32 beds, were owned by the state. The four large hospitals were in Davidson, Hamilton, Knox and Shelby Counties, with two owned by the city-county, one by the county and one by a non-profit association. There was one other tuberculosis hospital owned by a non-profit association (Hawkins County). The distribution of these hospitals is given in Table V.

TABLE V

NUMBER OF TUBERCULOSIS HOSPITALS AND
BEDS BY COUNTIES

COUNTY	HOSPITALS	BEDS
STATE	7	1,091
DAVIDSON	2	274
GREENE	1	32
HAMILTON	1	225
HAWKINS	1	40
KNOX	1	145
SHELBY	1	375

* One small hospital which had thirty beds assigned to tuberculosis patients has been classed general.

TABLE VI

NUMBER OF HOSPITALS AND BEDS FOR SPECIAL SERVICES, EXCLUDING
NERVOUS AND MENTAL AND TUBERCULOSIS HOSPITALS BY COUNTIES

COUNTY	TOTAL		ORTHOPEDIC		EYE, EAR, NOSE AND THROAT		CHRONIC AND CONVALESCENT		OTHER	
	HOS- PITALS	BEDS	HOS- PITALS	BEDS	HOS- PITALS	BEDS	HOS- PITALS	BEDS	HOS- PITALS	BEDS
STATE	28	1,019	5	213	7	149	10	259	6	398
DAVIDSON	8	167	1	36	-	-	6	111	1 ^a	20
HAMILTON	7	285	-	-	2	30	1	25	4 ^b	230
SHELBY	9	511	4	177	1	63	3	123	1 ^c	148
SULLIVAN	1	10	-	-	1	10	-	-	-	-
WASHINGTON	3	46	-	-	3	46	-	-	-	-

(a) Alcoholic

(b) One hospital each of the following types: maternity, 17 beds; children, 99 beds; alcoholic, 14 beds; venereal disease, 100 beds.

(c) Venereal disease

The desired ratio for beds in tuberculosis hospitals is 2.5 times the average annual number of deaths from tuberculosis. For the five years, 1940 - 1944, the average annual number of tuberculosis deaths for Tennessee was 2,097 and, thus, the number of recommended beds would be 5,242. This recommended number of beds in tuberculosis hospitals (5,242) was 4.8 times the actual number (1,091) in Tennessee.

OTHER SPECIAL HOSPITALS - Twenty-eight other hospitals were for specific services. The number of these hospitals and beds according to type of service are given in Table VI.

The maximum allowance for beds for chronic disease patients is 2 per 1,000 population.

C. OWNERSHIP OF HOSPITALS

The ownership of hospitals has been classified into three groups; namely, 1) governmental, which includes state, city, county and city-county; 2) non-profit which includes church and other non-profit associations; 3) proprietary which includes individual, partnership and corporation. The number of hospitals with hospital beds according to ownership, type of service and size are given in Table VII.

TABLE VII

NUMBER OF HOSPITALS AND BEDS ACCORDING TO OWNERSHIP,
TYPE OF SERVICE AND SIZE

OWNERSHIP AND TYPE OF SERVICE	TOTAL		UNDER 50 BEDS		50 - 99 BEDS		100 BEDS AND OVER	
	HOS- PITALS	BEDS	HOS- PITALS	BEDS	HOS- PITALS	BEDS	HOS- PITALS	BEDS
TOTAL	145	15,087	103	2,351	17	1,044	25	11,692
PROPRIETARY	80	1,770	74	1,442	6	328	-	-
GENERAL	56	1,210	52	992	4	218	-	-
NERVOUS AND MENTAL	4	170	3	120	1	50	-	-
OTHER SPECIAL	20	390	19	330	1	60	-	-
NON-PROFIT	41	3,932	20	649	9	563	12	2,720
GENERAL	34	3,385	17	533	6	357	11	2,495
TUBERCULOSIS	2	265	1	40	-	-	1	225
OTHER SPECIAL	5	282	2	76	3	206	-	-
GOVERNMENTAL	24	9,385	9	260	2	153	13	8,972
GENERAL	11	1,634	7	188	-	-	4	1,446
NERVOUS AND MENTAL	5	6,578	1	40	-	-	4	6,538
TUBERCULOSIS	5	826	1	32	1	54	3	740
OTHER SPECIAL	3	347	-	-	1	99	2	248

Over half of the hospitals in Tennessee (80 or 55 per cent) were proprietary hospitals; 41 (28 per cent) were non-profit; and 24 (17 per cent) were governmental hospitals. The proprietary hospitals, however, had only 11.7 per cent of the hospital beds. The non-profit had 26 per cent and the governmental hospitals, 62.2 per cent.

The proprietary hospitals were small hospitals. Each one of these had less than 100 beds. Only six had 50 beds or more. The non-profit hospitals were larger than the proprietary hospitals, with 12 of the 41

having 100 beds or more. Of the 24 hospitals owned by city, county, or state, 13 had 100 beds or more.

D. PATIENT SERVICES

In this section of the report, selected data regarding use of the hospitals are presented. In Table VIII the admissions and patient days are given according to type of service of the hospital.

During the period of one year, there were 225,964 admissions to the hospitals.

Of these hospital admissions 195,567, or 86.5 per cent, were in general hospitals. The general hospital admission rate was 64.2 per 1,000 population, or 6 per 100. Disregarding readmissions, on the average one out of every 16 persons was admitted to a general hospital.

The admission rates to the special hospitals are of interest. For nervous and mental hospitals, the rate was 1.5 per 1,000 population, for tuberculosis, 0.6 per 1,000 population, for venereal disease, 3.5 per 1,000 population, and for eye, ear, nose and throat, 3.1 per 1,000 population.

TABLE VIII

ADMISSIONS WITH RATES PER 1,000 POPULATION, PATIENT DAYS,
AVERAGE LENGTH OF STAY AND DAILY CENSUS ACCORDING TO
TYPE OF SERVICE OF HOSPITAL

TYPE OF SERVICE	ADMISSIONS #		PATIENT DAYS	AVERAGE LENGTH OF STAY	AVERAGE DAILY CENSUS
	NUMBER	RATE			
TOTAL	225,964	74.2	4,502,307	19.9	12,335
GENERAL	195,567	64.2	1,643,067	8.4	4,502
NERVOUS AND MENTAL	4,662	1.5	2,315,383	496.7	6,344
TUBERCULOSIS	1,683	0.6	323,007	191.9	885
OTHER SPECIAL	24,052	7.9	220,850	9.2	605
VENEREAL DISEASE	10,685	3.5	64,580	6.0	177
EYE, EAR, NOSE AND THROAT	9,325	3.1	27,709	3.0	76
ORTHOPEDIC	2,065	0.7	54,436	26.4	149
MATERNITY	562	0.2	5,022	8.9	14
CHILDREN	1,321	0.4	14,393	10.9	39
CHRONIC AND CONVALESCENT	94	*	54,710	582.0	150

* Less than 0.05 per 1,000.

Admissions to 131 hospitals for which data were given. Fourteen small hospitals with 321 beds were not in operation in 1944 or failed to give the information for other reasons.

The average lengths of stay varied from very long periods for chronic and convalescent and nervous and mental patients to very short periods for venereal disease and eye, ear, nose and throat patients. The patients remained in general hospitals on the average 8.4 days.

The average daily census given in the last column of the table shows the average number of hospital patients on a given day. On the average on a given day there were 12,335 persons in hospitals or 4.1 per 1,000 population. Slightly over half of these patients were in nervous and mental hospitals where the rate was 2.1 per 1,000 population. The average daily census in general hospitals was 4,502 or 1.5 per 1,000 population.

The numbers of births and deaths in these hospitals with rates per 1,000 admissions are given in Table IX.

The number of births reported by these hospitals was 31,346 which gave a rate of 138.7 per 1,000 admissions. Nearly all of these births, 31,027 (99.0 per cent), occurred in general hospitals and the rate for general hospitals was 158.7 per 1,000 admissions or 15.9 per 100 admissions. Thus, probably one out of six admissions to general hospitals was for obstetrical services. At present in the United States, about one-seventh of all hospital beds are used for obstetrical care.

According to information tabulated from birth certificates, 34,200 births were recorded in Tennessee hospitals in 1944. There is a difference of 2,854 births as stated in the hospital survey and from birth certificates. Some of the survey reports may not have been for the calendar year 1944. Also, births occurring in some of the small hospitals or clinics and those in the

TABLE IX

BIRTHS AND DEATHS WITH RATES PER 1,000 ADMISSIONS
ACCORDING TO TYPE OF SERVICE OF HOSPITAL

TYPE OF SERVICE	ADMISSIONS	BIRTHS		DEATHS	
		NUMBER	RATE	NUMBER	RATE
TOTAL	225,964	31,346	138.7	7,871	34.8
GENERAL	195,567	31,027	158.7	6,694	34.2
NERVOUS AND MENTAL	4,662	-	-	675	144.8
TUBERCULOSIS	1,683	1	0.6	283	168.2
OTHER SPECIAL	24,052	318	13.2	219	9.1

large hospital at Oak Ridge in Anderson County have not been included. In Anderson County, 676 hospital births were recorded which were not included in the survey.

In 1944, 69,799 births were recorded in Tennessee. Using the 31,346 hospital births reported by the hospitals in the survey, 44.9 per cent of the births occurred in them. From the data given on certificates, 49.0 per cent of the births occurred in hospitals. Of the births to mothers resident of the cities of 10,000 population and over, 76 per cent occurred in hospitals, while of births from other areas, only 36 per cent occurred in hospitals. There has been an increase each year in Tennessee in the number of hospital births and proportion of births occurring in hospitals. According to information given on birth certificates in 1934, only 7,674 or 14.7 per cent of the live births occurred in hospitals while in 1944 over three times as many, 49.0 per cent, occurred in hospitals. Thus, the use of hospitals for delivery has increased. Further increase will depend on the provision of hospital beds in rural as well as in urban areas.

In the United States in 1944, 75.6 per cent of the births occurred in hospitals. In several states the percentages were above 90. In New York State, 95.0 per cent of the births occurred in hospitals. With increasing hospital facilities and use of hospitals for delivery, it is expected that the percentage of births in hospitals will approach 100 per cent.

The number of deaths reported in the survey of Tennessee hospitals was 7,871 or 34.8 per 1,000 admissions. Of these deaths,

6,694 or 85.0 per cent occurred in general hospitals. There were 675 deaths in nervous and mental hospitals or 8.6 per cent of the deaths in hospitals. The numbers of deaths in tuberculosis hospitals (283) and in other special hospitals (219) were small.

For 1944, 28,619 deaths were recorded in Tennessee. Using the 7,871 hospital deaths reported from the hospitals included in the survey, 27.5 per cent of the deaths were in these hospitals. Of the tuberculosis deaths in Tennessee in 1944, 1,883, only 283 or 15.0 per cent occurred in tuberculosis hospitals.

Data from death certificates for 1944 revealed that 9,251 deaths or 32.3 per cent of all deaths recorded in Tennessee occurred in hospitals. This number, 9,251, is 1,380 larger than the number of hospital deaths reported in the survey. This difference is due to deaths in Veterans and Army hospitals, to deaths in a few small hospitals and in Oak Ridge Hospital. During the war years two large hospitals, Thayer General in Davidson County and Kennedy General in Shelby County, were in operation and deaths would have occurred in them.

In the United States in 1944, 45.4 per cent of the deaths occurred in all types of institutions including hospitals. As institutions such as feeble minded and rest homes are probably included, this figure is slightly higher than the percentage of deaths in hospitals. In New York State, 55.4 per cent of the deaths were in institutions. It is believed that 50 per cent of deaths would occur in hospitals if hospital beds were provided in all sections of the State. This is the standard used in

TABLE X

NUMBER OF BEDS, AVERAGE DAILY CENSUS, AND PERCENTAGE OCCUPANCY
ACCORDING TO TYPE OF SERVICE AND OWNERSHIP

TYPE OF SERVICE	TOTAL			NON-PROFIT			PROPRIETARY			GOVERNMENTAL		
	BEDS	AVERAGE CENSUS	PERCENT-AGE OCCUPANCY	BEDS	AVERAGE CENSUS	PERCENT-AGE OCCUPANCY	BEDS	AVERAGE CENSUS	PERCENT-AGE OCCUPANCY	BEDS	AVERAGE CENSUS	PERCENT-AGE OCCUPANCY
TOTAL	14766*	12335.1	83.5	3872	3007.5	77.7	1509	1004.1	66.5	9385	8323.5	88.7
GENERAL	6025*	4501.6	74.7	3325	2566.0	77.2	1066	701.7	65.8	1634	1233.8	75.5
NERVOUS AND MENTAL	6748	6343.5	94.0	-	-	-	170	118.1	69.5	6578	6225.4	94.6
TUBERCULOSIS	1091	884.9	81.1	265	237.1	89.5	-	-	-	826	647.8	78.4
OTHER SPECIAL	902*	605.1	67.1	282	204.4	72.5	273	184.3	67.5	347	216.4	62.4

* Data regarding patient days for use in calculating average census were not given for eight general hospitals, six proprietary and two non-profit, with 204 beds; and for six other special proprietary hospitals with 117 beds.

planning for hospital care.

The occupancy of hospitals has to be considered in hospital planning. In Table X data regarding percentage occupancy of hospitals are given according to type of service and ownership.

The 131 hospitals giving data regarding admissions and patient days reported 4,502,307 patient days, or on the average 12,335.1 patients per day. These 131 hospitals had 14,766 beds and the percentage occupancy was 83.5. The percentage occupancy of general hospitals was 74.7. The percentages for the non-profit and governmental

general hospitals were higher than for the proprietary hospitals. The percentage occupancy for the nervous and mental hospitals was 94.0 and for tuberculosis hospitals, 81.1. The other special hospitals had a smaller percentage occupancy (67.1) than the general, tuberculosis and nervous and mental hospitals.

Study of the general hospitals by size of hospital showed that the percentage occupancy varied by size (Table XI). For general hospitals with 100 beds or more, on the average 78.9 per cent of the beds were occupied, while for those with less beds,

TABLE XI

NUMBER OF BEDS, AVERAGE DAILY CENSUS AND PERCENTAGE OCCUPANCY
IN GENERAL HOSPITALS ACCORDING TO SIZE

SIZE OF HOSPITAL	BEDS	AVERAGE CENSUS	PERCENTAGE OCCUPANCY
TOTAL	6,025	4,501.6	74.7
UNDER 50 BEDS	1,559	1,064.7	68.3
50 - 99 BEDS	525	326.1	62.1
100 BEDS AND OVER	3,941	3,110.8	78.9

66.7 per cent were occupied on the average. This is in accordance with findings in other areas and has been useful in hospital planning.

All of the beds in tuberculosis, nervous and mental and other special hospitals are allotted for specific services. In addition some of the beds in general hospitals are allotted for specific services.

TABLE XII

ALLOTMENT OF BEDS TO SPECIFIC SERVICES
ACCORDING TO TYPE OF HOSPITAL

SPECIFIC SERVICE	TYPE OF HOSPITAL				
	TOTAL	GENERAL	NERVOUS AND MENTAL	TUBERCULOSIS	OTHER SPECIAL
HOSPITALS - NUMBER	145	101	9	7	28
HOSPITAL BEDS	15,087	6,229	6,748	1,091	1,019
GENERAL MEDICAL	469	469	-	-	-
GENERAL SURGICAL	662	662	-	-	-
OBSTETRICAL	690	673	-	-	17
PEDIATRIC	514	415	-	-	99
CONTAGIOUS	91	91	-	-	-
TUBERCULOSIS	1,152	61	-	1,091	-
NERVOUS AND MENTAL	6,810	50	6,748	-	12
CHRONIC, CONVALESCENT AND REST	254	7	-	-	247
VENEREAL DISEASE	248	-	-	-	248
ORTHOPEDIC	213	-	-	-	213
EYE, EAR, NOSE AND THROAT	149	-	-	-	149
ALCOHOLIC	34	-	-	-	34
UNASSIGNED	3,801	3,801	-	-	-

In Table XII the number of beds allotted to specific services are given according to type of hospital.

Of the 6,229 general hospital beds, 3,801, or 61.0 per cent, were not allotted for a specific service. The two services with the largest numbers of assigned beds were obstetrical with 673 and general surgical with 662 beds. The number of beds assigned for general medical was 469 and for pediatric 415.

The total number of beds for specific services are also shown in Table XII. In addition to 1,091 beds in tuberculosis hospitals there were only 61 other beds designated for tuberculosis patients. Fifty beds in general hospitals and 12 in other special hospitals were allotted to nervous and mental patients which gave a total of 6,810 beds for nervous and mental patients.

E. HOSPITAL EXPENSE

Eighty hospitals supplied data on the schedules regarding expenses. In general, these were the larger hospitals. For the 80

hospitals reporting expenses, the patient days were 3,816,252. Thus, considering the total number of patient days for hospitals in this survey, expenses were obtained for over 80 per cent. The total expenses and expenses per day according to type of hospital are given in Table XIII.

The expenses per day varied considerably according to the type of hospital. The average cost per day in general hospitals was \$6.74. The expenses per day in nervous and mental hospitals was small, \$0.77. In tuberculosis hospitals, it was \$2.62 per day and in other special, \$3.27 per day. It is realized that the expense is usually greater in general hospitals which have patients for short periods of time. Expenses are less for patients requiring care over a long period of time.

A larger proportion of the governmental and non-profit hospitals supplied data regarding expenses than of the proprietary hospitals. Thirty of the 40 non-profit hospitals and 21 of the 24 governmental hospitals reported expenses. Only 29 of the 80 proprietary hospitals gave data on expenses. The expenses per day for the 80 hospitals

TABLE XIII

PATIENT DAYS AND EXPENSES FOR 80 HOSPITALS REPORTING EXPENSES
ACCORDING TO TYPE OF SERVICE OF HOSPITAL

TYPE OF SERVICE	NUMBER OF HOSPITALS	PATIENT DAYS	EXPENSES	EXPENSES PER DAY
TOTAL	80	3,816,252	\$10,494,000	
GENERAL	63	1,134,984	7,647,000	\$6.74
NERVOUS AND MENTAL	7	2,295,451	1,766,000	0.77
TUBERCULOSIS	4	278,476	730,000	2.62
OTHER SPECIAL	6	107,341	351,000	3.27

according to ownership and type are given in Table XIV.

The numbers of hospitals reporting in some of the groups are so small that conclusions regarding the expenses according to ownership may not be justified without consideration of the detailed services rendered. For the general hospitals, however, it may be noted that the expenses per day were \$5.61 for governmental hospitals, \$5.99 for proprietary and \$7.68 for non-profit hospitals.

F. HOSPITAL PERSONNEL

Information regarding personnel working in the hospitals was recorded for 143

hospitals. In this section of the report, the personnel employed full-time or part-time and volunteer personnel are given and the full-time personnel studied according to type and size of hospital and function of the personnel.

The 143 hospitals reported 9,781 persons working in the hospitals (Table XV). Of the 9,781 persons, 8,985 or 92.0 per cent were full-time personnel, 352 or 3.6 per cent were part-time and 424 or 4.3 per cent were volunteer personnel.

Two hospitals with 70 beds failed to give information regarding personnel. One general hospital with ten beds was reported to have only part-time personnel. For the remaining 142 hospitals, data regarding

TABLE XIV

EXPENSES PER DAY FOR 80 HOSPITALS REPORTING
ACCORDING TO OWNERSHIP AND TYPE OF SERVICE OF HOSPITAL

TYPE OF SERVICE	TOTAL			NON-PROFIT			PROPRIETARY			GOVERNMENTAL		
	TOTAL HOS- PITALS	HOSPITALS REPORTING NUM- BER	EXPENSES PER DAY	TOTAL HOS- PITALS	HOSPITALS REPORTING NUM- BER	EXPENSES PER DAY	TOTAL HOS- PITALS	HOSPITALS REPORTING NUM- BER	EXPENSES PER DAY	TOTAL HOS- PITALS	HOSPITALS REPORTING NUM- BER	EXPENSES PER DAY
TOTAL	145	80		41	30		80	29		24	21	
GENERAL	101	63	\$6.74	34	27	\$7.68	56	26	\$5.99	11	10	\$5.61
NERVOUS AND MENTAL	9	7	0.77	-	-	-	4	2	8.59	5	5	0.69
TUBERCULOSIS	7	4	2.62	2	1	1.92	-	-	-	5	3	2.89
OTHER SPECIAL	28	6	3.27	5	2	3.88	20	1	1.39	3	3	3.25

full-time personnel are given in Table XVI according to type and size of hospital.

In general hospitals there were 7,480 full-time personnel serving these hospitals

with 6,149 beds or 1.22 persons per bed. The personnel per bed in tuberculosis hospitals was 0.35 and for nervous and mental hospitals, 0.10. The small general hospi-

TABLE XV

NUMBER AND PERCENTAGE OF PERSONNEL, FULL-TIME, PART-TIME
AND VOLUNTEER BY TYPE OF SERVICE OF HOSPITAL

TYPE OF SERVICE	HOSPITALS	HOSPITALS REPORTING	TOTAL PERSONNEL	FULL-TIME PERSONNEL		PART-TIME PERSONNEL		VOLUNTEER PERSONNEL	
				NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
TOTAL	145	143	9,761	8,985	92.0	352	3.6	424	4.3
GENERAL	101	99	8,170	7,480	91.6	289	3.5	401	4.9
NERVOUS AND MENTAL	9	9	698	687	98.4	11	1.6	-	-
TUBERCULOSIS	7	7	418	383	91.6	35	8.4	-	-
OTHER SPECIAL	28	28	475	435	91.6	17	3.6	23	4.8

tals did not have as much personnel as did the large hospitals. This is, of course, related to the services rendered. Also, some of the large hospitals had nursing training schools which increased the per-

sonnel employed. The general hospitals with 100 beds and over had a ratio of 1.46 persons per patient, and the general hospitals with less than 50 beds had a ratio of 0.71 persons per patient.

TABLE XVI

NUMBER OF BEDS, FULL-TIME PERSONNEL AND PERSONNEL PER BED
ACCORDING TO TYPE OF SERVICE AND SIZE OF HOSPITAL

TYPE OF SERVICE	TOTAL			UNDER 50 BEDS			50 - 99 BEDS			100 BEDS AND OVER		
	BEDS	PERSONNEL NUMBER	PERSONNEL PER BED	BEDS	PERSONNEL NUMBER	PERSONNEL PER BED	BEDS	PERSONNEL NUMBER	PERSONNEL PER BED	BEDS	PERSONNEL NUMBER	PERSONNEL PER BED
TOTAL	15007	8985	0.60	2321	1567	0.68	994	787	0.79	11692	6631	0.57
GENERAL	6149	7480	1.22	1683	1197	0.71	525	537	1.02	3941	5746	1.46
NERVOUS AND MENTAL	6748	687	0.10	160	153	0.96	90	24	0.48	6538	510	0.08
TUBERCULOSIS	1091	383	0.35	72	28	0.39	54	33	0.61	965	322	0.33
OTHER SPECIAL	1019	435	0.43	406	189	0.47	365	193	0.53	248	53	0.21

The number of full-time personnel in general hospitals is given in Table XVII according to their function.

Six per cent of the personnel were considered administrative personnel. Nearly two-thirds (64.7) were professional. The

TABLE XVII

FULL-TIME PERSONNEL IN GENERAL HOSPITALS
ACCORDING TO FUNCTION, AND SIZE OF HOSPITAL

FUNCTION OF PERSONNEL	TOTAL		UNDER 50 BEDS		50 - 99 BEDS		100 BEDS AND OVER	
	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
TOTAL	7,480	100.0	1,197	99.9	537	100.0	5,746	99.9
ADMINISTRATIVE	447	6.0	131	10.0	38	7.1	278	4.8
DIETARY	743	9.9	174	14.5	61	11.4	508	8.8
HOUSEHOLD AND PROPERTY	1,384	18.5	174	14.5	64	11.9	1,146	19.9
PROFESSIONAL SERVICES	4,838	64.7	717	59.9	374	69.6	3,747	65.2
OUT-PATIENT SERVICE	68	0.9	1	0.1	-	-	67	1.2

professional personnel included those employed in medical and surgical service, nursing service, library service, social service, X-ray and radium department, laboratories, operating and delivery room, pharmacy, physical and occupational therapy departments, etc.

Data regarding type of nursing personnel were given for only 33 general hospitals (Table XVIII). These included all of the large general hospitals with 100 beds or more and eight of the ten general hospitals with 50-99 beds. Such information was obtained from only ten of the general hospitals with less than 50 beds. The schedule

used for the small hospitals did not include such detailed information.

These 33 hospitals supplying data regarding type of nursing personnel had 4,282 professional workers or 0.89 per bed. Of these workers 3,517 or 82 per cent were nursing personnel. There were 748 graduate nurses or 0.15 per bed. The student nurses numbered 1,910 or 0.40 per bed. The remaining 859 were practical nurses, attendants, nurses aides, and maids, etc. The nursing personnel per bed was greater for the hospitals with 50 or more beds than for the small hospitals due principally to the inclusion of student nurses.

TABLE XVIII

NURSING AND OTHER PROFESSIONAL FULL-TIME PERSONNEL IN 33 GENERAL HOSPITALS
WITH NUMBER PER BED ACCORDING TO SIZE OF HOSPITAL

TYPE OF PERSONNEL	TOTAL		UNDER 50 BEDS		50 - 99 BEDS		100 BEDS AND OVER	
	NUMBER	PER BED	NUMBER	PER BED	NUMBER	PER BED	NUMBER	PER BED
HOSPITALS REPORTING BEDS	33 4,828		10 412		8 475		15 3,941	
TOTAL PROFESSIONAL NURSING PERSONNEL	4,282 3,517	0.89 0.73	190 180	0.46 0.44	345 311	0.73 0.65	3,747 3,026	0.95 0.77
GRADUATE	748	0.15	61	0.15	71	0.15	616	0.16
STUDENT	1,910	0.40	-	-	126	0.27	1,784	0.45
PRACTICAL	174	0.04	74	0.18	59	0.12	41	0.01
ATTENDANT	30	0.01	-	-	3	0.01	27	0.01
NURSES AIDE	368	0.08	24	0.06	10	0.02	334	0.08
MAID AND OTHER	287	0.06	21	0.05	42	0.09	224	0.06
OTHER PROFESSIONAL	765	0.16	10	0.02	34	0.07	721	0.18

DISCUSSION

Selected data regarding hospital facilities have been presented to show the existing conditions in Tennessee. Although there are deficiencies in some of the data, considerable information has been obtained to show the needs and the factors to be considered in planning for hospitals and hospital beds for the population of Tennessee. Some of the hospitals included in the survey are small and the beds cannot be classed as acceptable according to standards. Also, under the federal provision for construction of hospitals, financial aid

will be available for only certain hospitals, those which are not used for profit. According to the Public Health Service Regulation issued pursuant to Public Law 725, 79th Congress, known as the Hospital Survey and Construction Act, a non-profit hospital means "any hospital owned and operated by a corporation or association, no part of the net earnings of which is applied, or may lawfully be applied, to the benefit of any private shareholder or individual." A detailed discussion of the needs of hospital and health department facilities will be given in the fourth section of this report.

HOSPITAL AND HEALTH DEPARTMENT FACILITIES AND NEEDS IN TENNESSEE

II. SURVEY OF HEALTH DEPARTMENT FACILITIES IN TENNESSEE

In the state-wide inventory of hospital and health department facilities, schedules of information regarding public health services were completed. In the present report selected data from the survey of health departments in operation in December, 1945, have been used to show the type of facilities available and the services rendered to the population of Tennessee.

A. DISTRIBUTION OF HEALTH FACILITIES

Schedules were completed for three city-county health departments (Chattanooga-Hamilton, Memphis-Shelby, and Jackson-Madison), for two city health departments (Knoxville and Nashville) and for fifty-one counties with full-time health service. In all, fifty-six schedules were obtained for study of the facilities and services rendered.

The counties in Tennessee with full-time health services are shown in Figure 1. Thirty-four counties had full-time health

departments (including the three city-county health departments referred to above); two counties (Davidson and Knox) also had city health departments, and twenty counties were included in seven district health departments. Forty-one counties were without full-time health service at the time of this survey in December, 1945. These counties without health service, with a few exceptions, were located in two areas namely, in the upper Cumberland section and in the section of Tennessee cut by the Tennessee River as it flows north. Both of these sections include sparsely populated areas and many of the poor counties of the state.

The estimated 1944 population* of the area of Tennessee with full-time health service was 2,394,873. Based on the estimated population of the state of 3,045,345,

* The estimated population for 1944 is used in this report since data for services and personnel were submitted for the year 1944.

FIGURE 1

FULL-TIME COUNTY HEALTH DEPARTMENTS AND DISTRICT HEALTH DEPARTMENTS, 1944



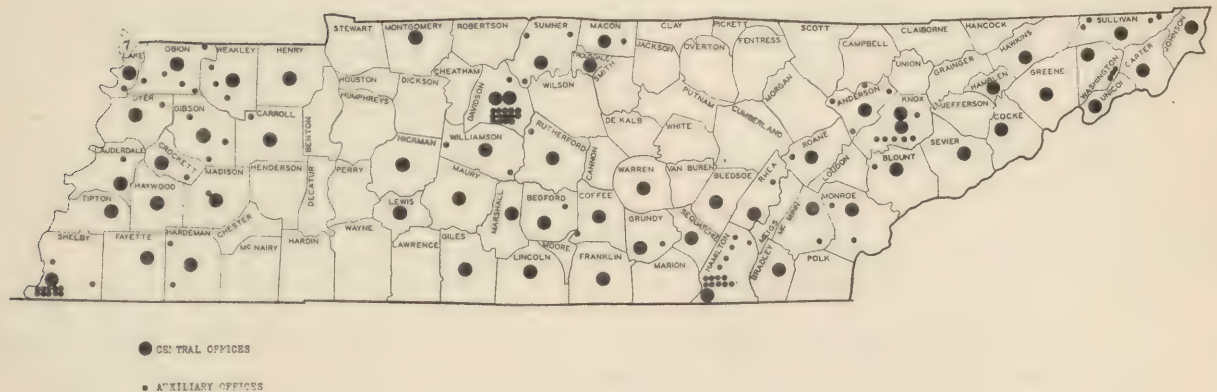
78.6 per cent of the population had full-time health service. Although forty-one counties were without full-time health service at the time of this survey, twenty-one of these had had such service at some time in the past. Shortages of professional personnel during the war and since termination of the war were in part responsible for lack of health services and lack of coverage of the remaining 650,472 population.

In the schedules sent to the health departments, information was obtained regarding the central offices and auxiliary offices in these areas. It has been found that in addition to administrative or central offices in the county seats, offices are needed in other centers of population.

Through such auxiliary offices, services are being made available to the population in many isolated communities. Even within the large cities, decentralization of health service has been found advantageous to the program and several additional health offices have been established in centers distributed over the cities. In addition to the 56 central offices, there were 93 auxiliary offices. The locations of the central offices are shown in Figure 2 by a large black dot and the location of the auxiliary offices by smaller dots. The locations of the auxiliary offices within the cities of Chattanooga, Knoxville, Memphis, and Nashville could not be shown but the numbers of such offices are indicated by

FIGURE 2

LOCATION OF 56 CENTRAL OFFICES AND 93 AUXILIARY OFFICES
IN AREAS WITH FULL-TIME LOCAL HEALTH SERVICE, 1944



the group of small dots near the large dot indicating the central office. There are two central offices shown for the city and county health departments in Davidson and Knox Counties.

B. BUILDINGS USED BY HEALTH DEPARTMENTS

Health department facilities are housed in many different kinds of buildings. The common practice in the past has often been to assign one or two rooms in the court

house for the health department. Such space in the small court houses has not been satisfactory for use in an active program rendering clinic service for venereal disease, tuberculosis, maternal and child hygiene, etc. The types of buildings in use at the time of the survey are given in Table I for the 56 central offices and 93 auxiliary offices.

Twenty-eight health facilities were housed in separate buildings; twenty-two of these were the central offices and six were

auxiliary offices. Twelve of the separate buildings were designed for health facilities and the remaining sixteen were residences, stores, etc.

TABLE 1

TYPES OF BUILDINGS HOUSING HEALTH
FACILITIES FOR CENTRAL AND
AUXILIARY OFFICES

TYPE OF BUILDING	TOTAL	CEN- TRAL OFFICE	AUXIL- IARY OFFICE
TOTAL	149	56	93
SEPARATE BUILDING	28	22	6
HEALTH DEPARTMENT	12	10	2
RESIDENCE	7	4	3
STORE OR BANK	4	4	-
HOSPITAL, MEDICAL SCHOOL OR DOCTOR'S OFFICE	3	3	-
OTHER BUILDING	2	1	1
IN OTHER BUILDING	121	34	87
COUNTY COURT HOUSE	14	14	-
CITY HALL OR MUNICIPAL BUILDING	15	2	13
STORE OR BANK	8	3	5
SCHOOL	14	-	14
OFFICE	15	9	6
HOSPITAL, MEDICAL SCHOOL OR DOCTOR'S OFFICE	12	1	11
COMMUNITY CENTER	14	-	14
RESIDENCE	6	1	5
OTHER GOVERNMENT BUILDING	11	3	8
OTHER BUILDING	12	1	11

Nearly all of the auxiliary offices and thirty-four of the fifty-six central offices were housed in buildings designed for purposes other than the health department. In a few instances in the construction

of a court house or city hall plans were made for the assignment of certain space for the health department. In Table I, however, the building is classed according to its primary purpose. The county court house was used for offices of fourteen health departments. With the exception of one large health department in a court house designed to include the health department, the quarters in court houses averaged 3.5 rooms and had 877 square feet of floor space. These central offices were considered inadequate for the programs being conducted. Many of the auxiliary offices were found in city halls, schools, hospitals and community centers. The establishment of clinics in community centers has been valuable in rendering health department service to the population. Also clinics in hospitals are being found advantageous. Several of the newer auxiliary centers have been established in hospitals and community centers.

Nearly half of the central offices were rented. Sufficient space usually was not available in the court house or other public buildings. Only eight of the 93 auxiliary offices were rented. When space for these auxiliary offices was not available in public buildings, it was usually donated.

The adequacy of space has been evaluated by the health officers and for 46 or 31 per cent of the facilities the space was considered adequate (Table II).

For central offices, only space in separate buildings was considered adequate to carry on the program and only twelve of the central offices in separate buildings were adequate. The eleven county health departments and one city health department

TABLE II

ADEQUACY OF SPACE FOR CENTRAL AND AUXILIARY OFFICES

BUILDING	TOTAL			CENTRAL OFFICES			AUXILIARY OFFICES		
	TOTAL	NUM- BER	PER CENT	TOTAL	NUM- BER	PER CENT	TOTAL	NUM- BER	PER CENT
TOTAL	149	46	31	56	12	21	93	34	37
SEPARATE BUILDING	28	13	46	22	12	55	6	1	17
IN OTHER BUILDING	121	33	25	34	0	-	87	33	38

with adequate central office buildings for the health department programs as now being conducted are listed below:

1. Coffee County with central office in Manchester of nine rooms, 3,748 square feet of floor space, built for the health department in 1943 by the federal government.
2. Gibson County with central office in Trenton of sixteen rooms, 6,452 square feet of floor space, built for the health department in 1937 by the Commonwealth Fund.
3. Marshall County with central office in Lewisburg of fifteen rooms, 2,883 square feet of floor space, built for the health department in 1944 by the Federal Works Administration and purchased by the county.
4. Monroe County with central office in Madisonville of seven rooms, 1,574 square feet of floor space, built for the health department in 1941 by the county.
5. Montgomery County with central office in Clarksville of fifteen rooms, 4,790 square feet of floor space, built for the health department in 1943 by the Federal Works Administration and purchased by the county.
6. Obion County with central office in Union City of nine rooms, 1,728 square feet of floor space, built

for the health department in 1940 by the county.

7. Rutherford County with central office in Murfreesboro of twenty-one rooms, 7,833 square feet of floor space, built for the health department in 1931 by the Commonwealth Fund.
8. Sullivan County with central office in Blountville of twelve rooms, 5,100 square feet of floor space, built in 1937 by the Commonwealth Fund.
9. Unicoi County with central office in Erwin of five rooms, 924 square feet of floor space. This is a residence built in 1927 which is being used for the health department.
10. Weakley County with central office in Dresden of seven rooms, 1,980 square feet of floor space, built for the health department in 1938 by the county.
11. Williamson County with central office in Franklin of twenty-five rooms, 4,770 square feet of floor space, built for the health department in 1936 by the county.
12. Nashville City Health Department of 62 rooms, 31,619 square feet of floor space in a separate building originally designed for a hospital in 1913.

TABLE III

NUMBER OF ROOMS AND FLOOR SPACE IN ADEQUATE AND INADEQUATE CENTRAL AND AUXILIARY OFFICES

TYPE OF OFFICE	NUMBER OF HEALTH FACILITIES	TOTAL ROOMS	AVERAGE NUMBER OF ROOMS	AVERAGE SQUARE FEET FLOOR SPACE PER FACILITY	AVERAGE SQUARE FEET FLOOR SPACE PER ROOM
TOTAL	148*	667	4.5	1297	288
CENTRAL OFFICE, ADEQUATE	11	141	12.8	3798	296
CENTRAL OFFICE, INADEQUATE	44	283	6.4	1708	266
AUXILIARY OFFICE, ADEQUATE	34	91	2.7	862	322
AUXILIARY OFFICE, INADEQUATE	59	152	2.6	775	301

* One large health department facility with 62 rooms and 31,619 square feet of floor space has been excluded from this table as it was very large and was not typical of health facilities in Tennessee.

A higher proportion of the auxiliary offices in other buildings were considered adequate. Eleven of the fourteen offices in community centers, five in schools, three in hospitals and 14 others in various buildings were adequate for the purposes for which they were being used.

The number of rooms and floor space of adequate and inadequate central and auxiliary offices has been studied for use in planning for health department facilities (Table III).

The adequate central offices of county health departments had 12.8 rooms while the inadequate had only 6.4 rooms. The average square feet of floor space for adequate health departments, 3,798, was over twice that found in inadequate health departments, 1,708. The auxiliary offices consisted of 2.6 rooms on the average and of 807 square feet of floor space. The adequate and inadequate auxiliary offices differed only slightly in size.

TABLE IV

NUMBER OF ROOMS IN ADEQUATE AND INADEQUATE CENTRAL OFFICES AND AUXILIARY OFFICES

NUMBER OF ROOMS	CENTRAL OFFICES ADEQUATE	INADEQUATE OFFICES	AUXILIARY OFFICES
TOTAL	12	44	93
1	-	-	31
2	-	6	30
3	-	7	15
4	-	8	6
5	1	5	2
6	-	5	4
7	2	4	1
8	-	2	1
9	2	-	-
10	-	2	2
11	-	1	-
12	1	-	-
13	-	-	-
14	-	-	1
15	2	-	-
16 AND OVER*	4	4	-

* Adequate central offices with 16, 21, 25 and 62 rooms; inadequate central offices with 17, 18, 22 and 31 rooms.

The numbers of rooms in adequate and inadequate central offices are given in Table IV. Since the adequate and inadequate auxiliary offices did not differ in size, the combined data are presented.

Although office space of less than five rooms was not satisfactory for central offices, two-thirds of the auxiliary offices had only one and two rooms and many of these small auxiliary offices were satisfactory.

C. PERSONNEL OF HEALTH DEPARTMENTS

For this section of the report the personnel employed in health departments has been studied. The type of personnel, full-time or part-time, and the distribution of the full-time personnel have been obtained. In Table V the personnel employed either full-time or part-time in the 56 health departments is given according to type of personnel.

TABLE V

FULL-TIME AND PART-TIME PERSONNEL EMPLOYED IN HEALTH DEPARTMENTS ACCORDING TO TYPE

TYPE OF PERSONNEL	TOTAL	FULL-TIME	PART-TIME
TOTAL	782	732	50
MEDICAL	85	56	29
NURSING	271	263	8
SANITARY ENGINEERS AND SANITARIANS	121	121	-
DENTISTS	2	2	-
TECHNICIANS	2	2	-
LABORATORY	22	21	1
VETERINARIANS	2	1	1
PHARMACIST	1	1	-
VENEREAL DISEASE INVESTIGATORS	5	5	-
HEALTH EDUCATORS	5	5	-
NON-PROFESSIONAL	266	255	11

Although usually full-time personnel are employed for health department work, fifty part-time persons were also working in health departments during the period covered in this survey. Twenty-nine of these were medical personnel assisting in clinics and eight were nurses. The total number of

doctors serving full-time or part-time was 85. There were 271 nurses and 121 sanitary engineers and sanitarians and 39 other professional personnel working in health departments. The non-professional personnel numbered 266.

As given in these survey reports, there were 732 full-time workers in health departments. On the basis of the total population of Tennessee, this gave 2.4 workers per 10,000 population. In the areas served, however, there were 3.1 workers per 10,000 population. In Table VI and Figure 3 the numbers of workers per 10,000 population are shown for the county, city and district health departments.

In only ten areas (two city, two city-county, five county and one district health department) were there as many as 2.5 workers per 10,000 population. For a county of

20,000 population this would mean five workers. The minimum recommended staff for a health department has been the four-piece unit of health officer, nurse, sanitarian and clerk. The need for public health nurses would be at least one per 5,000. Thus the staff for a county of 20,000 population should be seven or 3.5 per 10,000 population. In only two city-county health departments, two city health departments, one county with special program and one other county health department were there sufficient public health personnel for conducting the health department program.

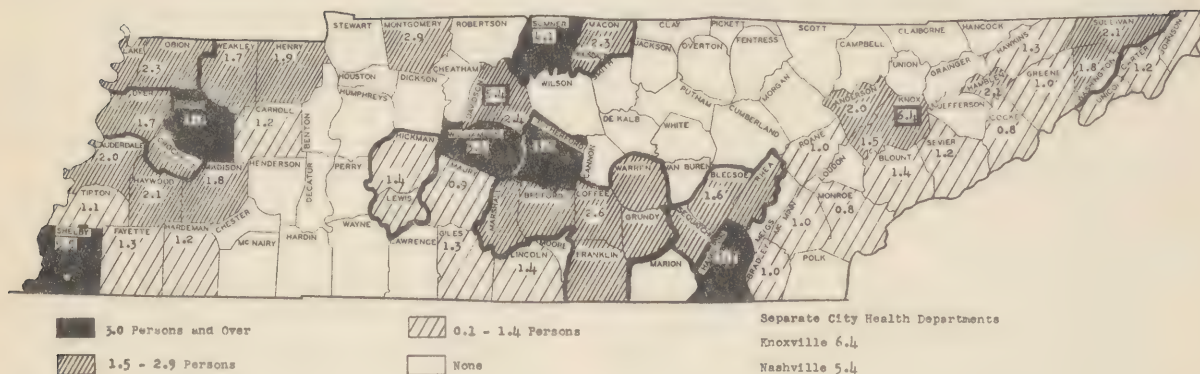
The types of personnel with rates per 10,000 population are given in Table VII for the state, for the four city areas with large health departments (Knoxville, Nashville, Chattanooga-Hamilton and Memphis-Shelby County), and for the other health

TABLE VI
NUMBER OF FULL-TIME PERSONNEL IN COUNTY, CITY AND DISTRICT
HEALTH DEPARTMENTS WITH NUMBER PER 10,000 POPULATION

HEALTH DEPARTMENT	NUMBER	RATE	HEALTH DEPARTMENT	NUMBER	RATE
TOTAL	732	3.1	MONROE	2	0.8
COUNTY			ROANE	3	1.0
ANDERSON	6	2.0	RUTHERFORD	12	3.5
BLOUNT	6	1.4	SEVIER	3	1.2
BRADLEY	3	1.0	SHELBY-MEMPHIS	208	5.5
CARROLL	3	1.2	SULLIVAN	16	2.1
COCKE	2	0.8	SUMNER	14	4.1
DAVIDSON	24	2.4	TIPTON	3	1.1
FAYETTE	4	1.3	WASHINGTON	10	1.8
GIBSON	15	3.3	WEAKLEY	5	1.7
GILES	4	1.3	WILLIAMSON	9	3.4
GREENE	4	1.0	CITY		
HAMBLEN	4	2.1	KNOXVILLE	73	6.4
HAMILTON-CHATTANOOGA	70	3.7	NASHVILLE	94	5.4
HARDEMAN	3	1.2	DISTRICT		
HAWKINS	4	1.3	BEDFORD, COFFEE, FRANKLIN		
HAYWOOD	6	2.1	GRUNDY, MARSHALL, WARREN	30	2.6
HENRY	5	1.9	BLED SOE, RHEA, SEQUATCHIE	5	1.6
KNOX	11	1.5	CARTER, JOHNSON, UNICOI	8	1.2
LAUDERDALE	5	2.0	CROCKETT, DYER	9	1.7
LINCOLN	4	1.4	HICKMAN, LEWIS	3	1.4
MCMINN	3	1.0	LAKE, OBION	10	2.3
MADISON-JACKSON	10	1.8	MACON, TROUSDALE	5	2.3
MAURY	4	0.9			
MONTGOMERY	10	2.9			

FIGURE 3

FULL-TIME PERSONNEL IN HEALTH DEPARTMENTS AND DISTRICTS
WITH NUMBER PER 10,000 POPULATION



departments in the state. The rates for the state are based on the estimated population for the entire state. For the two areas with full-time health service the rates are based on the population in those areas. There were 41 counties without full-time health service.

Of the 732 full-time public health workers, 445 or 61 per cent were employed in the four health departments which include the large cities of Tennessee. There

were 5.2 workers per 10,000 population in these areas and only 1.9 per 10,000 population in the remaining counties with full-time health service. The nursing service in the state was limited to less than one public health nurse per 10,000 population. The number of personnel of each type per 10,000 population was greater for the four areas with large cities than for the other areas. As with hospital beds and other facilities, the cities are better able for financial

TABLE VII

FULL-TIME PERSONNEL WITH RATES PER 10,000 POPULATION FOR
FOUR LARGE HEALTH DEPARTMENTS AND FOR 52 OTHER HEALTH DEPARTMENTS
ACCORDING TO TYPE OF PERSONNEL

TYPE OF PERSONNEL	TOTAL		TWO-CITY COUNTY AND TWO CITY HEALTH DEPARTMENTS		52 OTHER HEALTH DEPARTMENTS	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
TOTAL	732	2.4	445	5.2	287	1.9
MEDICAL	56	0.2	23	0.3	33	0.2
NURSING	263	0.9	146	1.7	117	0.8
SANITATION	121	0.4	81	1.0	40	0.3
OTHER PROFESSIONAL	37	0.1	34	0.4	3	*
NON-PROFESSIONAL	255	0.8	161	1.9	94	0.6

* Less than 0.05

and other reasons to provide services for the population than are the other areas of the state.

D. SERVICES RENDERED BY HEALTH DEPARTMENTS

The kinds of services rendered by health department personnel are many; some can be measured and others cannot. Through the daily coding and counting of certain activities and through summaries of these activities from monthly tabulations, information was obtained regarding some of the work carried on in health departments. These services were principally office visits, field visits, immunizations, and examinations. These services were rendered in the following programs: communicable disease control, venereal disease control, tuberculosis control, maternity service, infant and preschool hygiene, school hygiene, adult hygiene, morbidity service, crippled children service, general sanitation and protection of food and milk. These services are rendered by the personnel of the local health department. In addition, direct services in several fields such as in tuberculosis control through mobile X-ray units, in dental hygiene through examinations and corrections, in industrial hygiene, in nutrition, in venereal disease control through treatment centers, are being provided by the State Health Department. Such services are not included in this report as they are not administered by the local department. The coordinated plan for hospital and health department facilities is concerned principally with the physical facilities for the local health departments and hospitals in the cities and counties of the state.

For presentation of the services rendered (Table VIII) the office and field visits for the year 1944 for the 56 health departments* have been tabulated. Examinations, immunizations and visits for treatment and advice have been considered office visits. The field visits by sanitary engineers and sanitarians, public health nurses and medical officers are also given.

* For one health department data for 1945 were used; the services rendered were believed to be practically the same as in 1944.

TABLE VIII

OFFICE AND FIELD VISITS BY LOCAL HEALTH DEPARTMENT PERSONNEL ACCORDING TO TYPE OF SERVICE, 1944

SERVICE	TOTAL	OFFICE	FIELD
TOTAL	1,351,479	897,962	453,517
VENEREAL DISEASE	447,088	414,316	32,772
TUBERCULOSIS	119,442	81,286	38,156
IMMUNIZATIONS	228,390	228,390	-
SANITATION	171,538	-	171,538
OTHER	385,021	173,970	211,051

For the year, the total number of visits obtained from these summaries was 1,351,479. Based on the estimated population of 2,394,873 for the area with full-time health service this would give 0.56 visits per capita. Nearly two-thirds of the visits were office visits (897,962) and the remaining were field visits (453,517).

The year for which data were obtained was a war year and emphasis was placed on certain services by the health department personnel. One of these services was venereal disease control and one-third of the visits were for discovery of or treatment of syphilis, gonorrhea and other venereal diseases. Services in this field have changed greatly in the last few years due to the rapid treatment of syphilis and use of penicillin in treatment of gonorrhea. At present, treatments for syphilis are being given in medical centers and thus the office visits in health departments have been reduced.

According to this tabulation, 119,442 or nine per cent of the visits by health department personnel were for tuberculosis control. At present through mobile and transportable units with use of small films, this service is being extended and many thousands of X-ray examinations are being made through surveys in industries, communities and high schools.

There were 228,390 persons immunized in 1944. Immunizations refer to those persons who received the appropriate agent for active immunization. Actually the number of office visits for such immunizations probably exceeded the number of persons immun-

ized. Immunizations have been divided according to type as follows:

Smallpox	54,280
Typhoid Fever	115,111
Diphtheria	40,622
Whooping Cough	13,898
Other and Unspecified	4,469

The field visits for sanitation were divided according to type of program as follows:

Environmental Sanitation	100,120
Food Sanitation	48,284
Milk Sanitation	23,134

In environmental sanitation were included visits to private premises in the interest of construction of privies, septic tanks and water supplies; to swimming pools; to schools; to public water supplies and to sewage plants.

The visits included under other services were those for maternal and child hygiene, school hygiene, communicable disease control, crippled children service, examination of food handlers, etc. There were 385,021 visits in which such services were rendered.

In addition to the tabulated office and field visits, services in recording of vital statistics and morbidity statistics

were rendered routinely. The laboratory specimens handled through the health departments were 568,686. There were 2,190 lectures reported with attendance of 168,699.

These activities of the local health departments require administrative office space, clinic and laboratory space, conference and demonstration rooms, space for record files, space for dental and X-ray equipment, etc. in the central office and auxiliary clinic space in other buildings.

E. EXPENDITURES BY HEALTH DEPARTMENTS

The budgeted expenditures for the last fiscal year (July 1, 1944 - July 1, 1945) were given by the 56 health departments. Thus, the money available for local health service can be studied according to source of funds. In addition to the health work administered by local health departments, services are also rendered by the State Health Department personnel. In Table IX the amount of budgeted expenditures and per capita expenditures are given for the state and for the two areas with full-time health service.

The total budgeted expenditures for the 56 local full-time health departments was \$1,938,742 for the fiscal year. Based on the estimated population of Tennessee this was 64 cents per capita. Nineteen cents per capita from federal funds, four cents per capita from state funds, 40 cents per

TABLE IX

BUDGETED EXPENDITURES BY HEALTH DEPARTMENTS WITH PER CAPITA EXPENDITURES FOR FOUR LARGE HEALTH DEPARTMENTS AND FOR 52 OTHER HEALTH DEPARTMENTS ACCORDING TO SOURCE OF FUNDS

SOURCE OF FUNDS	TOTAL		TWO CITY-COUNTY AND TWO CITY HEALTH DEPARTMENTS		52 OTHER HEALTH DEPARTMENTS	
	EXPENDITURES	PER CAPITA	EXPENDITURES	PER CAPITA	EXPENDITURES	PER CAPITA
TOTAL	\$1,938,742	\$0.64	\$1,095,944	\$1.28	\$842,798	\$0.55
FEDERAL	578,315	0.19	272,125	0.32	306,190	0.20
STATE	130,706	0.04	12,430	0.01	118,276	0.08
LOCAL	1,204,329	0.40	809,589	0.94	394,740	0.26
OTHER	25,392	0.01	1,800	*	23,592	0.02

* Less than 0.005 cents

capita from local funds and one cent per capita from other funds were spent for full-time local health services. This amount of budgeted expenditures per capita from all sources is much below the minimum recommended of \$2.50 per capita for full-time health service.

The two large city-county health departments, Memphis-Shelby and Chattanooga-Hamilton, and two city health departments, Knoxville and Nashville, were able to make greater provisions for health facilities than were the rural areas of the state. The per capita budgeted expenditures for these four areas was \$1.28 while for the 52 other health departments it was \$0.55.

The expenditures of federal money within the state during this war year were governed in part by special problems such as venereal disease control and location of military facilities.

The year for which data were obtained was one in which health facilities were limited within the state. Sufficient medical and nursing personnel were not available for carrying on health departments. Several departments were closed due to lack of personnel. Of the 41 counties without full-time local health service at the time of this survey, 21 had made financial pro-

vision for health service at some time in the past.

DISCUSSION

Selected data regarding health departments, the buildings now in use, the personnel, services rendered and expenditures by health departments have been presented to show the size and nature of the program at present. Such data will be useful in planning for the extension of the program to the entire population of the state and for the integration of community services through construction of health department and hospital facilities. Planning for construction of health department centers is included in Public Law 725, 79th Congress, known as the Hospital Survey and Construction Act. According to the allowance under that law for public health centers, the number should not exceed one per 30,000 state population. For Tennessee this would be approximately 100. The planning for space for these health department services in hospitals and in separate buildings is an important part of the hospital plan. Discussion of the need in this field will be given in the fourth section of this report.

* * *

HOSPITAL AND HEALTH DEPARTMENT FACILITIES AND NEEDS IN TENNESSEE

III. RELATED RESOURCES

Many factors need to be considered in planning for hospital and health department facilities. Some of these factors which can be studied are population distribution, density of population, income, birth and death rates, use of hospitals, and availability of medical, dental and nursing personnel. Selected data for Tennessee and for the counties of the state are presented for use in the development of the hospital and health department program.

A. POPULATION

The distribution of the population, the growth and expected growth of the population of the state and within the state, and the age distribution are all factors that need careful consideration in planning of facilities.

The population of Tennessee according to the federal census on April 1, 1940 was 2,915,841. In the ten years from 1930 to 1940, an 11.4 per cent increase was noted or an average increase of 1.1 per cent per year. This percentage increase was only slightly less than that from 1920 to 1930 (Table I).

TABLE I

POPULATION, INCREASE OF POPULATION AND
PERCENTAGE INCREASE ACCORDING TO
CENSUS, 1900-1940, TENNESSEE

YEAR	POPULATION	INCREASE	
		NUMBER	PER CENT
1900	2,020,616		
1910	2,184,789	164,173	8.1
1920	2,337,885	153,096	7.0
1930	2,616,556	278,671	11.9
1940	2,915,841	299,285	11.4

Since the federal census is taken only every ten years, estimates need to be made for populations in the intercensal years. During the past few years since the 1940

census, there has been considerable movement of population. New industries were established and many persons moved about, living for short periods of time in different sections of the country. Estimates of population by any method will be inaccurate. It is believed that in general the arithmetic method provides population estimates which can be used and interpreted with consideration of other known factors regarding the population. For the cities and counties of Tennessee it has been assumed that the annual increase from April 1, 1930 to April 1, 1940 would continue beyond 1940. For the seven counties in which the population decreased between 1930 and 1940, the 1940 census figures have been used. These figures for the counties have been added to give the estimated population for the state for each year. The estimated population for Tennessee for 1944, the year for which data were obtained for this study, was 3,045,345. The estimated populations through 1950 would be as follows:

1944	3,045,345
1945	3,075,815
1946	3,106,289
1947	3,136,755
1948	3,167,230
1949	3,197,704
1950	3,228,176

Such a growth of the population of Tennessee seems logical based on previous growth, and birth and death rates. The only unknown factors which could prevent such growth would be emigration of population from the state. Although during the war years, Tennessee lost over 200,000 persons to the armed forces, it is believed that the majority of the military personnel have returned to the state. Even during the war years it did not seem advisable to exclude these persons from the population base as they were selected for service on the basis of good health. For birth, death, hospital bed and other rates, the estimated populations as described above have been used.

The Department of Commerce issued a report giving the estimated civilian population of the United States by counties on November 1, 1943. These estimates were based on the registration for War Ration Book Four. This estimate for Tennessee was 2,818,226 which indicated a loss of population from 1940 of 97,615. Using data for registrations for war ration books, statistics of military inductions and separations, and statistics of births and deaths, the Department of Commerce released an estimate of civilian population for states for July 1, 1945. The estimated civilian population of Tennessee was 2,832,480 and the loss to the armed forces, 258,668. With the return of the majority of the military personnel it is believed that the estimated population of Tennessee for 1946 would probably be similar to the figure obtained by using the arithmetic method, namely 3,106,289. The estimates of population for Tennessee without exclusion of military personnel seem preferable in the calculation of rates and analysis of data.

The state is divided into 95 counties which vary in population from 4,117 to 380,251. There were 11 counties with less than 10,000 estimated population in 1944 and four with over 100,000 population. In the four counties with large populations are located the cities of over 100,000 population, Chattanooga, Knoxville, Memphis and Nashville. There are eight smaller

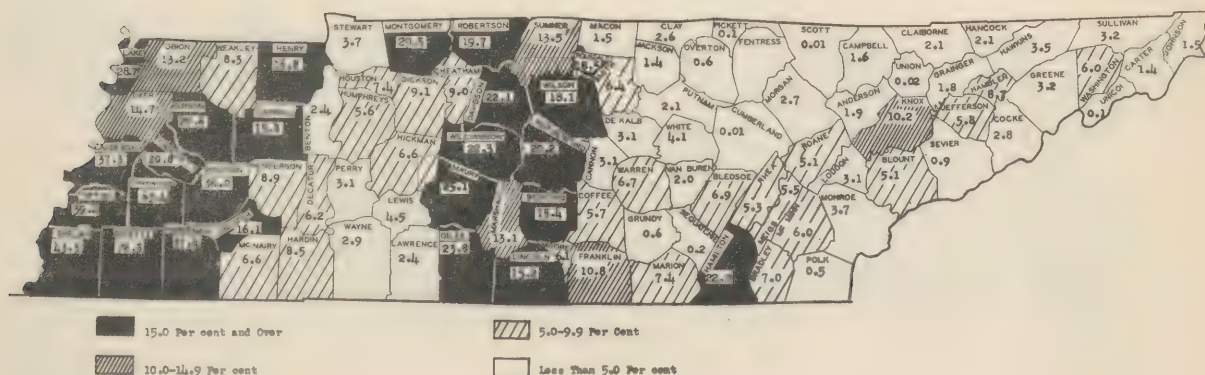
cities with populations from 10,000 to 30,000. These 12 cities with 10,000 population and over are given below with the counties in which they are located.

City	County	City	County
Bristol.....	Sullivan	Jackson.....	Madison
Chattanooga...	Hamilton	Johnson City..	Washington
Clarksville..	Montgomery	Kingsport.....	Sullivan
Cleveland.....	Bradley	Knoxville.....	Knox
Columbia.....	Maury	Memphis.....	Shelby
Dyersburg.....	Dyer	Nashville.....	Davidson

The increase in population between 1930 and 1940 occurred in both urban and rural areas. The 12 cities listed above had an 11.3 per cent increase in the ten years while the remainder of the population of Tennessee increased 11.5 per cent. Only seven counties showed a decrease in population between 1930 and 1940.

According to the last census, of the total population for Tennessee of 2,915,841 on April 1, 1940, 2,395,586 (82.2 per cent) were native white, 11,320 (0.4 per cent) were foreign born white, 508,736 (17.4 per cent) were negro and 199 were of other races. The colored population was distributed unevenly over the state. In 1940, 56.3 per cent of the colored population of the state was concentrated in West Tennessee, with 30.5 per cent in Shelby County. In two counties in this section, Fayette and Hay-

FIGURE 1
PERCENTAGE OF POPULATION COLORED BY COUNTIES OF TENNESSEE, 1940



POPULATION DISTRIBUTION BY BROAD AGE GROUPS
ACCORDING TO CENSUS, 1900 - 1940

YEAR	TOTAL POPULATION	POPULATION UNDER 15		POPULATION 15 - 44		POPULATION 45 - 64		POPULATION 65 AND OVER	
		NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT	NUMBER	PER CENT
1900	2,020,616	786,466	38.9	918,001	45.4	249,451	12.3	66,698	3.3
1910	2,184,789	808,281	37.0	1,008,599	46.2	284,306	13.0	83,603	3.8
1920	2,337,885	844,338	36.1	1,057,610	45.2	334,654	14.3	101,283	4.3
1930	2,616,556	869,830	33.2	1,216,238	46.5	411,278	15.7	119,210	4.6
1940	2,915,841	856,003	29.4	1,405,712	48.2	482,348	16.5	171,778	5.9

wood, the colored population exceeded the white population. In Middle Tennessee the proportion of the population that was colored was less than that in West Tennessee. The percentages of the population which were colored are shown in Figure 1 by counties. In 40 counties the colored population was less than 5.0 per cent of the total population. In 25 others, the colored population was 5.0-9.9 per cent of the total and in 32 counties it was ten per cent or more of the population.

The age distribution of the population needs to be considered in planning for hospitals. Rates of hospitalization increase with advancing age and thus a population with a large proportion of persons in the older age groups would have a greater need for hospital beds for illness than would a population with a small proportion of the population in the older age groups.

The age distribution of the population of Tennessee has been changing. In 1900 38.9 per cent of the population was under 15 years of age while in 1940 only 29.4 per cent of the population was under 15 years. The percentage of the population 65 years and over has increased from 3.3 in 1900 to 5.9 in 1940. The distribution of the population of Tennessee in four broad age groups is given in Table II.

The age distribution of the population of the counties of the state showed considerable variation. In many of the counties of East Tennessee the percentages of the population under 15 years of age were relatively high. Counties with high percentage of the population under 15 years were those that have a young population and high birth rate. These percentages are shown in Figure 2. While the percentages of the population under 15 years of age were in gen-

FIGURE 2

PERCENTAGE OF POPULATION UNDER 15 YEARS OF AGE
BY COUNTIES OF TENNESSEE, 1940

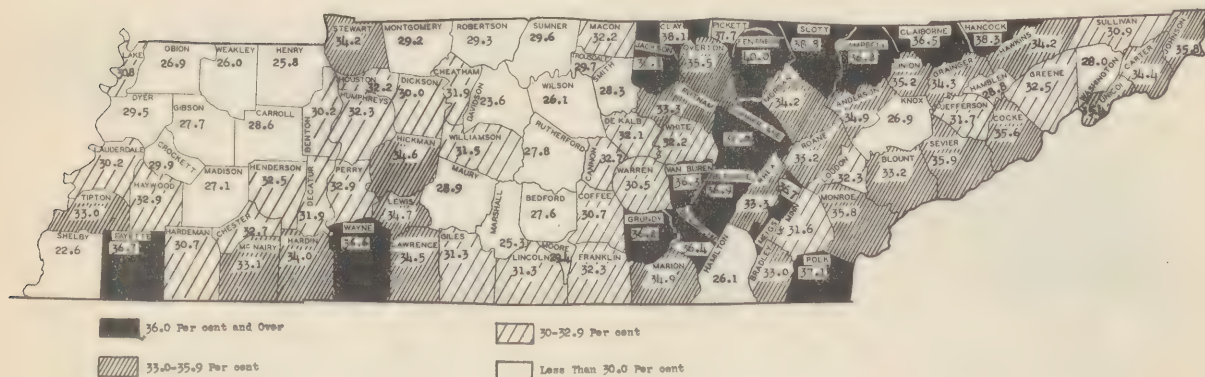
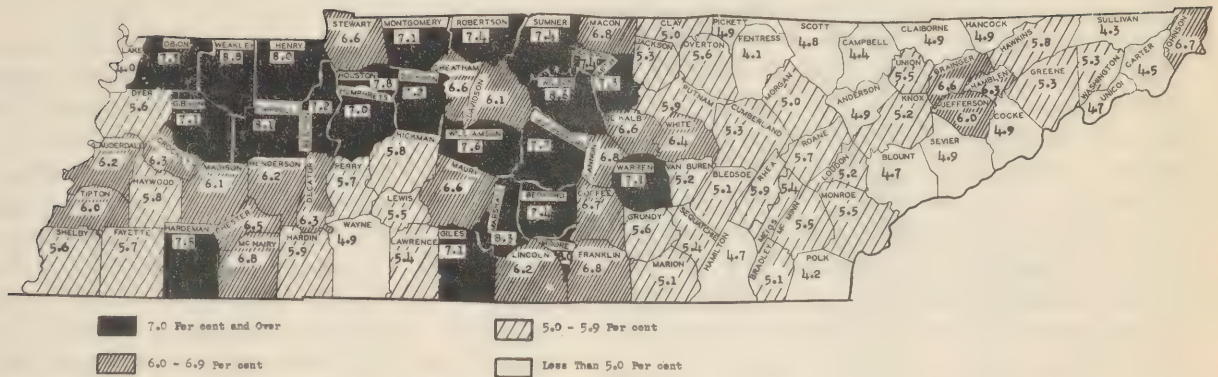


FIGURE 3

PERCENTAGE OF POPULATION 65 YEARS AND OVER
BY COUNTIES OF TENNESSEE, 1940



eral relatively high for counties in East Tennessee, the percentages of the population 65 years and over were relatively high in many counties in Middle and West Tennessee (Figure 3).

The density of population varied widely in the counties of Tennessee from 17.0 persons per square mile in Van Buren County to 511.1 persons per square mile in Davidson County. With the exception of two counties in Middle Tennessee and three counties in West Tennessee, the more densely populated counties were found in East Tennessee. In East Tennessee there were 14 counties with 70.0 and over persons per square mile.

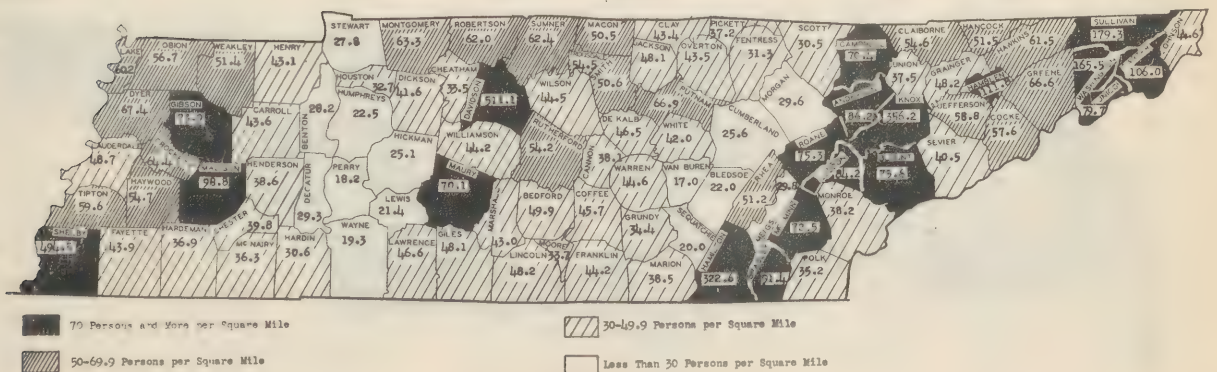
The number of persons per square mile is shown for the counties of Tennessee in Figure 4.

B. FINANCIAL RESOURCES

The financial resources of counties and of individuals are important factors to be considered in planning for construction of hospitals and hospitalization of sick individuals. For information regarding the financial resources of counties, the Tax Aggregate Report of Tennessee for 1945-1946 prepared under direction of the State Board of Equalization, was used. The total amount

FIGURE 4

DENSITY OF POPULATION BY COUNTIES OF TENNESSEE, 1944



The average per capita county tax was \$9.65. The range of these taxes was great from a low \$2.89 per person in Pickett County to \$17.28 in Morgan County. The county taxes per person are shown in Figure 5. The counties with taxes per person of \$10.00 and over are scattered over the state with many of them in East Tennessee. The sparsely populated areas on the Cumberland Plateau and the section of the state near the Tennessee River as it flows north have low taxes. The county taxes as given in Table III will be considered in the provision of local resources for hospital and health facilities. Counties with small populations and limited resources such as Van Buren County with only \$13,411 in county taxes, Pickett County with \$18,684, Moore

The bank deposits are useful in the analysis of the financial situation. From data published in Report of Tennessee Department of Insurance and Banking the deposits per person in Tennessee were found to be \$416 per person in 1945. There was considerable variation in these bank deposits per person by counties (Figure 6). The deposits per person for the four large city-counties, Davidson, Hamilton, Knox, and Shelby, exceeded \$600 per person. Eighteen others had deposits of \$350 or more per person, namely Bradley, Greene, Hamblen, and Washington in East Tennessee; Bedford, Coffee, Lewis, Marshall, Montgomery, Moore, Rutherford, Smith, Trousdale, Warren, and Wilson in Middle Tennessee; and Gibson, Madison, and Obion in West Tennessee. There were 30 counties in which the bank deposits were less than \$200 per person. Counties with bank deposits of \$350 or more per capita include those best able to finance facilities while the group of counties with deposits of less than \$200 per capita include counties least able to finance hospital and health facilities.

COUNTY TAX PER PERSON, BY COUNTY, TENNESSEE
(TAX AGGREGATE REPORT FOR 1945 - 1946)



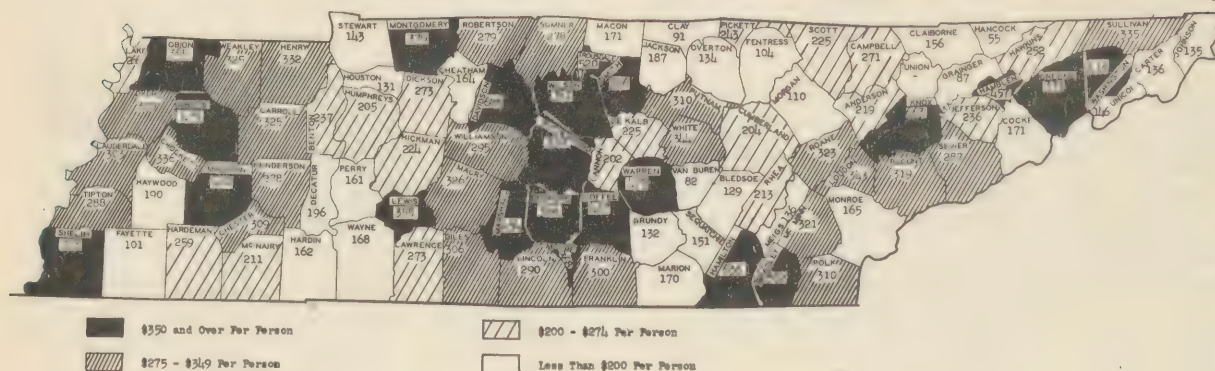
COUNTY TAXES¹. TAXES PER PERSON AND BANK DEPOSITS²
PER PERSON BY COUNTIES OF TENNESSEE

COUNTY	COUNTY TAXES TOTAL PER PERSON		BANK DEPOSITS PER PERSON	COUNTY	COUNTY TAXES TOTAL PER PERSON		BANK DEPOSITS PER PERSON
STATE	\$29,399,671	\$ 9.65	\$ 416	LAKE	111,104	9.62	266
				LAUDERDALE	249,858	10.03	303
ANDERSON	274,782	9.35	219	LAWRENCE	247,943	8.39	273
BEDFORD	167,670	6.98	366	LEWIS	41,728	6.84	355
BENTON	62,838	5.11	237	LINCOLN	224,249	8.02	290
BLED SOE	57,295	6.45	129	LOUDON	182,429	8.81	343
BLOUNT	704,280	15.95	319	MACON	56,929	3.71	171
BRADLEY	327,758	10.61	382	MCMINN	331,400	10.51	321
CAMPBELL	329,408	9.99	271	MCNAIRY	229,977	11.14	211
CANNON	69,700	6.78	202	MADISON	525,256	9.48	420
CARROLL	213,399	8.21	325	MARION	183,825	9.28	170
CARTER	453,103	12.04	136	MARSHALL	232,590	14.34	454
CHEATHAM	85,019	8.24	164	MAURY	300,682	6.98	326
CHESTER	82,782	7.30	309	MEIGS	44,656	6.86	136
CLAIBORNE	182,612	7.36	156	MONROE	214,438	8.41	165
CLAY	57,572	5.02	91	MONTGOMERY	294,156	8.55	379
COCKE	225,035	8.98	171	MOORE	26,114	6.34	368
COFFEE	97,948	4.93	407	MORGAN	275,454	17.28	110
CROCKETT	117,589	6.79	336	OBION	363,295	11.43	365
CUMBERLAND	113,322	6.53	204	VERTON	73,085	3.80	134
DAVIDSON	3,323,085	12.22	688	PERRY	61,782	8.02	161
DECATUR	53,800	5.21	196	PICKETT	18,684	2.89	243
DEKALB	54,100	3.67	225	POLK	243,040	15.71	310
DICKSON	165,893	8.20	273	PUTNAM	181,166	6.63	310
DYER	408,454	11.22	309	RHEA	243,594	13.99	213
FAYETTE	246,828	7.98	101	ROANE	373,369	12.78	323
FENTRESS	81,515	5.21	104	ROBERTSON	341,432	11.61	279
FRANKLIN	211,683	8.54	300	RUTHERFORD	366,670	10.73	350
GIBSON	432,939	9.66	475	SCOTT	263,004	15.68	225
GILES	294,172	9.88	306	SEQUATCHIE	28,728	5.26	151
GRAINGER	84,698	5.63	87	SEVIER	126,429	5.16	287
GREENE	414,812	10.06	371	SHELBY	3,067,421	8.07	703
GRUNDY	58,434	4.74	132	SMITH	133,936	8.15	356
HAMBLEN	212,680	10.93	457	STEWART	59,528	4.36	143
HAMILTON	2,554,391	13.49	636	SULLIVAN	827,751	10.79	335
HANCOCK	40,093	3.37	55	SUMNER	285,573	8.29	278
HARDEMAN	261,657	10.82	259	TIPTON	281,355	9.95	288
HARDIN	106,905	5.78	162	TROUSDALE	59,642	9.44	520
HAWKINS	214,026	7.04	252	UNICOI	164,147	11.13	146
HAYWOOD	166,880	5.88	190	UNION	29,410	3.26	-
HENDERSON	152,620	7.68	278	VAN BUREN	13,411	3.09	82
HENRY	302,746	11.70	332	WARREN	116,575	5.90	475
HICKMAN	114,393	7.42	224	WASHINGTON	487,475	9.01	416
HOUSTON	46,583	6.85	131	WAYNE	59,176	4.14	168
HUMPHREYS	92,034	7.31	205	WEAKLEY	282,610	9.55	325
JACKSON	92,963	5.91	187	WHITE	81,281	5.03	344
JEFFERSON	234,196	12.38	236	WILLIAMSON	284,997	10.87	295
JOHNSON	61,035	4.58	135	WILSON	206,245	7.98	361
KNOX	2,396,345	12.74	663				

1. Taxes from Tax Aggregate Report for 1945-1946, State Board of Equalization.

2. Deposits of Individuals, Partnerships, and Corporations on Dec. 31, 1945 divided by Estimated Population of Tennessee. Data for Deposits from Report of Tennessee Department of Insurance and Banking.

AVERAGE BANK DEPOSITS PER PERSON BY COUNTIES OF TENNESSEE, 1945
(BANK DEPOSITS FROM REPORT OF TENNESSEE DEPARTMENT OF INSURANCE AND BANKING)



Although some of the counties with relatively large bank deposits have high county taxes, this relation was not observed for all counties. Thus both bank deposits and county taxes will be useful in considering the ability of counties and individuals to pay for hospitalization and health work.

C. VITAL STATISTICS DATA

Vital Statistics data are necessary for understanding health problems and for hospital planning. For sound interpretation of these data and for use in planning, the factors which influence registration need to be understood.

The Tennessee Vital Statistics Law requires the attending physician, midwife, or other person attending a birth to file a birth certificate with the local registrar. The undertaker, or person burying a body, is responsible for filing a death certificate. The local registrar, appointed by the State Health Department, sends the certificates to the State Health Department for filing. In counties with full-time health service, the health officer is also the registrar and the health department personnel assists in securing registration of all births and deaths in the area.

Registration of deaths is known to be incomplete in many of the poorer and less densely populated counties such as on the

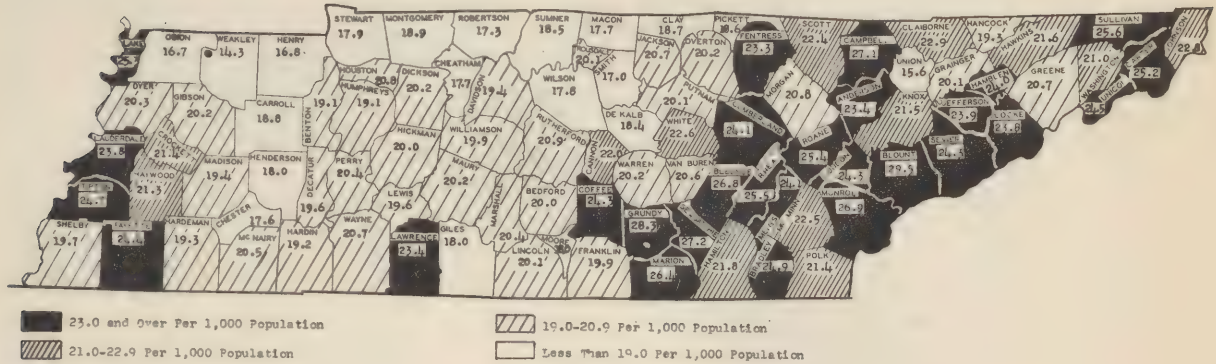
Cumberland Plateau and in the section cut by the Tennessee River as it flows north. These are areas without health departments with few hospital beds, and with few doctors. If doctors are not in attendance at birth and death, certificates may not be filed and even if death certificates are filed usually the causes of death will not be known. Without accurate data regarding deaths, the size and nature of health problems in these areas can not be known. With the addition of full-time health service in any area, more certificates of births and deaths are filed and registration becomes more complete.

During the war years, 1943 and 1944, vital statistics data were affected by the war. Registration of births improved with the institution of a cooperative program with the Office of Price Administration. Birth certificates were required for the receipt of food ration books for infants. This improvement in registration of births affects the birth rates and also infant and maternal death rates which are based on the live births. Consideration of these factors regarding registration is important in interpreting the birth and death rates which are presented in this section.

The birth rate for Tennessee increased during the war years due to an improvement in current registration and to an actual increase in births. The birth rate of 23.8 per 1,000 population in 1943 was the highest on record for Tennessee for the period

FIGURE 7

AVERAGE ANNUAL BIRTH RATES PER 1,000 POPULATION BY COUNTIES OF TENNESSEE
FOR FIVE-YEAR PERIOD 1940-1944, RESIDENT DATA



for which data are available; that is from 1917. The provisional figure for 1946 indicates that a new record will be established; for 1946, 76,171 birth certificates have been filed and the provisional birth rate was 24.5 per 1,000 population. For the five-year period, 1940-1944, for which data have been assembled for this study, the average annual number of births was 64,817 and the birth rate was 21.7. The average annual numbers of births are given by counties in Table IV and the birth rates are shown in Figure 7. Resident data are given for the state and for the counties.

High birth rates were noted in many counties in East Tennessee. As seen in Figure 2, counties with high percentages of the population under 15 years of age were also found in that section. This section of the state has a young, rapidly growing population. Probably registration was incomplete in several of the counties with relatively low birth rates.

From the study* of hospital beds needed in relation to births and deaths it was estimated that four beds at 75 per cent occupancy were needed for each 100 births for an average length of stay of mothers at time of delivery of 11 days. From the data regarding births by counties the number of beds needed for obstetrics can be estimated.

The death rate for Tennessee has shown a slight decline in the war years. The average number of deaths per year for the five years, 1940-1944, was 28,828 which gave a death rate of 9.7 per 1,000 population. The number of deaths and death rates by counties according to residence of the deceased are given in Table IV and the rates are shown in Figure 8.

The low death rates such as those of 2.7 per 1,000 population in Fentress County, 3.2 per 1,000 population in Pickett County, etc. indicate lack of registration. Medical and health facilities are lacking; many deaths are not attended by physicians and certificates are not filed. Death rates of less than 8.0 per 1,000 population are usually due to poor registration. Only in the counties with adequate facilities are deaths properly certified by physicians and recorded with the State Health Department.

According to the Michigan Study referred to above, for the country as a whole the public uses about 250 days of general hospital care for each death and correlated sickness in a general hospital giving a bed-death ratio of 0.7. If 50 per cent of all deaths occur in general hospitals and the death rate is 10.0 per 1,000 population, using a bed-death ratio of 0.7 and 75 per cent occupancy, 4.7 hospital beds would be needed per 1,000 population. From the data regarding deaths by counties and considering incompleteness of registration the num-

* "Hospital Resources and Needs," Report of the Michigan Hospital Survey, W. K. Kellogg Foundation, Battle Creek, Michigan, 1946.

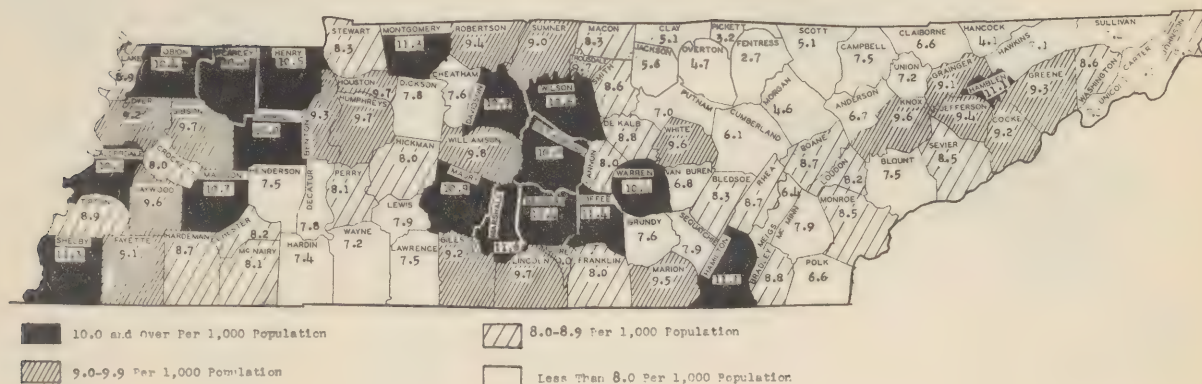
TABLE IV

AVERAGE ANNUAL NUMBER OF BIRTHS AND DEATHS WITH RATES PER 1,000 POPULATION
BY COUNTIES OF TENNESSEE FOR THE FIVE-YEAR PERIOD,
1940-1944. RESIDENT DATA

COUNTY	BIRTHS		DEATHS		COUNTY	BIRTHS		DEATHS	
	AVERAGE NUMBER	ANNUAL RATE	AVERAGE NUMBER	ANNUAL RATE		AVERAGE NUMBER	ANNUAL RATE	AVERAGE NUMBER	ANNUAL RATE
STATE	63,047.0	21.1	27,965.0	9.4	LAKE	289.0	25.3	101.6	8.9
ANDERSON	655.4	23.4	187.4	6.7	LAUDERDALE	588.2	23.8	248.6	10.1
BEDFORD	471.4	20.0	245.4	10.4	LAWRENCE	682.0	23.4	217.8	7.5
BENTON	232.0	19.1	113.2	9.3	LEWIS	117.0	19.6	47.2	7.9
BLED SOE	231.4	26.8	71.6	8.3	LINCOLN	553.8	20.1	267.8	9.7
BLOUNT	1,260.6	29.5	320.6	7.5	LOUDON	493.4	24.3	165.8	8.2
BRADLEY	741.0	24.9	262.6	8.8	MACON	268.2	17.7	125.2	8.3
CAMPBELL	869.0	27.1	242.2	7.5	MC MINN	701.6	22.5	246.8	7.9
CANNON	222.0	22.0	81.2	8.0	MC NAIRY	420.2	20.5	167.4	8.1
CARROLL	488.4	18.8	261.0	10.0	MADISON	1,063.4	19.4	587.2	10.7
CARTER	919.8	25.2	260.6	7.1	MARION	514.2	26.4	184.6	9.5
CHEATHAM	179.8	17.7	77.4	7.6	MARSHALL	328.4	20.4	187.2	11.6
CHESTER	197.8	17.6	92.2	8.2	MAURY	845.2	20.2	457.0	10.9
CLAIBORNE	565.4	22.9	162.6	6.6	MEIGS	155.4	24.1	41.6	6.4
CLAY	209.6	18.7	56.6	5.1	MONROE	670.2	26.9	211.8	8.5
COCKE	585.2	23.8	226.2	9.2	MONTGOMERY	641.4	18.9	381.8	11.3
COFFEE	471.6	24.3	221.4	11.4	MOORE	73.8	18.0	37.0	9.0
CROCKETT	370.2	21.4	138.2	8.0	MORGAN	324.4	20.8	72.0	4.6
CUMBERLAND	399.0	24.1	100.2	6.1	OBION	523.2	16.7	325.6	10.4
DAVIDSON	5,128.2	19.4	2,901.4	10.9	OVERTON	385.2	20.2	89.6	4.7
DECATUR	202.2	19.6	80.2	7.8	PERRY	155.8	20.4	61.6	8.1
DEKALB	270.2	18.4	129.0	8.8	PICKETT	117.8	18.6	20.2	3.2
DICKSON	404.0	20.2	156.4	7.8	POLK	331.6	21.4	101.8	6.6
DYER	725.6	20.3	327.6	9.2	PUTNAM	540.0	20.1	187.6	7.0
FAYETTE	748.6	24.4	280.0	9.1	RHEA	432.0	25.5	147.8	8.7
FENTRESS	348.8	23.3	41.2	2.7	ROANE	726.0	25.4	248.4	8.7
FRANKLIN	485.0	19.9	194.6	8.0	ROBERTSON	504.4	17.3	275.0	9.4
GIBSON	906.4	20.2	436.6	9.7	RUTHERFORD	710.0	20.9	369.2	10.9
GILES	532.0	18.0	272.0	9.2	SCOTT	367.6	22.4	83.6	5.1
GRAINGER	295.6	20.1	134.4	9.1	SEQUATCHIE	143.2	27.2	41.6	7.9
GREENE	835.0	20.7	374.4	9.3	SEVIER	582.2	24.3	203.0	8.5
GRUNDY	338.8	28.3	91.4	7.6	SHELBY	7,293.0	19.7	4,193.6	11.3
HAMLEN	458.0	24.0	211.0	11.1	SMITH	276.6	17.0	139.6	8.6
HAMILTON	4,038.6	21.8	2,060.4	11.1	STEWART	243.2	17.9	113.6	8.3
HANCOCK	223.6	19.3	47.8	4.1	SULLIVAN	1,869.2	25.6	524.8	7.2
HARDEMAN	460.8	19.3	207.8	8.7	SUMNER	621.8	18.5	304.0	9.0
HARDIN	349.4	19.2	135.2	7.4	TIPTON	694.2	24.7	250.8	8.9
HAWKINS	638.4	21.6	209.2	7.1	TROUSDALE	125.0	20.1	60.2	9.7
HAYWOOD	596.8	21.3	269.0	9.6	UNICOI	354.8	24.5	103.4	7.2
HENDERSON	352.2	18.0	147.6	7.5	UNION	141.2	15.6	65.0	7.2
HENRY	434.4	16.8	270.6	10.5	VAN BUREN	86.8	20.6	28.8	6.8
HICKMAN	303.8	20.0	121.8	8.0	WARREN	398.6	20.2	204.8	10.4
HOUSTON	138.2	20.8	64.6	9.7	WASHINGTON	1,113.8	21.0	453.0	8.6
HUMPHREYS	238.8	19.1	120.8	9.7	WAYNE	289.4	20.7	100.0	7.2
JACKSON	319.4	20.7	85.8	5.6	WEAKLEY	423.8	14.3	302.0	10.2
JEFFERSON	448.4	23.9	176.2	9.4	WHITE	363.8	22.6	155.0	9.6
JOHNSON	300.2	22.8	109.4	8.3	WILLIAMSON	512.2	19.9	252.4	9.8
KNOX	3,944.8	21.5	1,762.4	9.6	WILSON	455.0	17.8	271.2	10.6

FIGURE 8

**AVERAGE ANNUAL DEATH RATES PER 1,000 POPULATION BY COUNTIES OF TENNESSEE
FOR FIVE-YEAR PERIOD, 1940-1944, RESIDENT DATA**



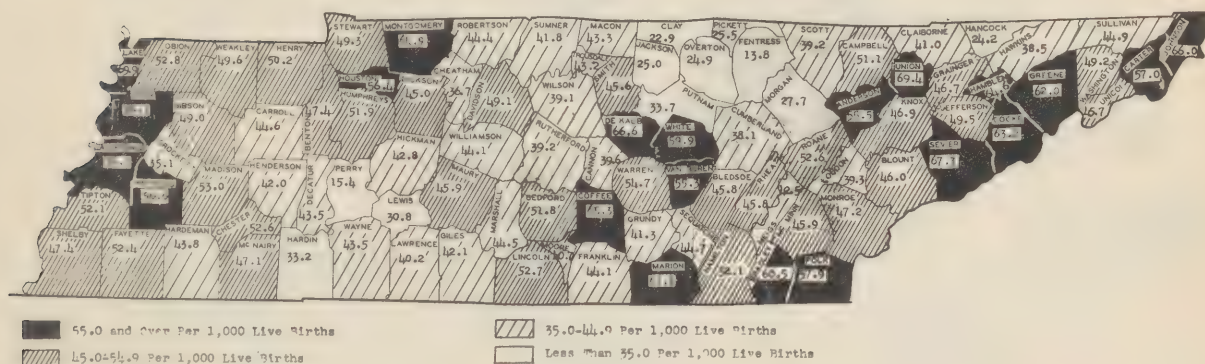
ber of beds needed for general hospitals can be estimated.

Infant and maternal death rates and tuberculosis death rates are shown for the counties of Tennessee for the five-year period, 1940-1944, in Figures 9, 10, and 11. The incompleteness of registration of deaths is evident on each one of these charts with low rates in the Upper Cumber-

land region. Careful comparisons with the state rates and with rates in nearby counties, however, will be of value in understanding the problems. For the state, average annual rates for the five-year period were as follows: 49.1 infant deaths per 1,000 live births, 3.4 maternal deaths per 1,000 live births, and 70.3 tuberculosis deaths per 100,000 population.

FIGURE 9

**AVERAGE ANNUAL INFANT DEATHS PER 1,000 LIVE BIRTHS BY COUNTIES
OF TENNESSEE FOR FIVE-YEAR PERIOD 1940-1944, RESIDENT DATA**



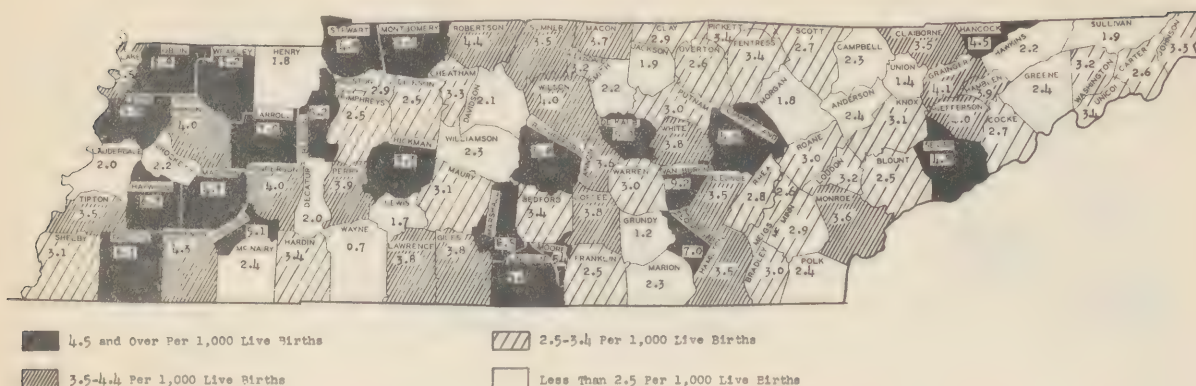
D. BIRTHS AND DEATHS IN HOSPITALS

Data regarding the place of birth and death given on the certificates include the name of the hospital if birth or death

occurred in a hospital. The numbers and percentages of the births and deaths occurring in hospitals can thus be obtained from analysis of data from the birth and death certificates filed in the State Health Department.

FIGURE 10

AVERAGE ANNUAL MATERNAL DEATHS PER 1,000 LIVE BIRTHS BY COUNTIES
OF TENNESSEE FOR FIVE-YEAR PERIOD 1940-1944, RESIDENT DATA



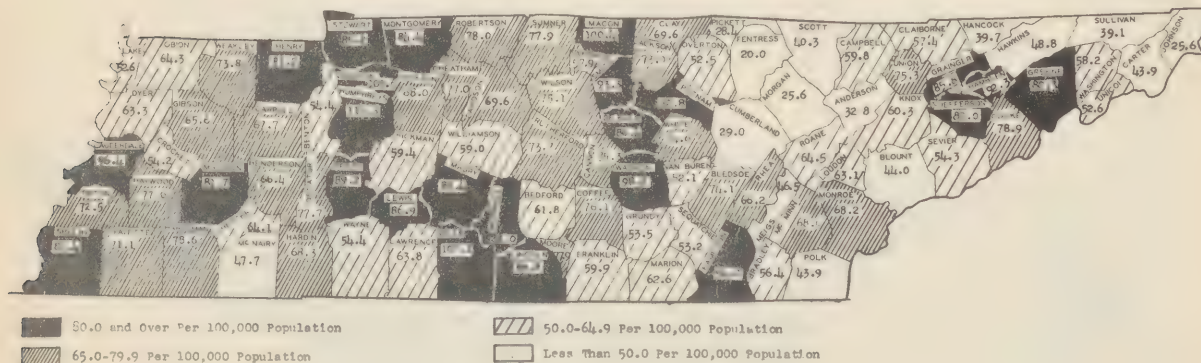
The number of births* occurring in hospitals in Tennessee has shown a rapid increase in recent years. In 1934, the first year for which these data are available,

* Birth used in this report refers to live birth.

only 7,674 births were known to have occurred in hospitals while in 1945, 36,084 or 4.7 times as many occurred in hospitals. The percentage of births occurring in hospitals has increased from 14.7 in 1934 to 54.2 in 1945. The numbers and percentages

FIGURE 11

AVERAGE ANNUAL TUBERCULOSIS DEATH RATES PER 100,000 POPULATION BY COUNTIES
OF TENNESSEE FOR FIVE-YEAR PERIOD 1940-1944, RESIDENT DATA



of births occurring in hospitals by year are given in Table V.

For study of the use of hospitals for delivery of mothers in urban and rural areas of Tennessee, the data for the twelve cities of over 10,000 population termed the urban area and for the rest of Tennessee, the rural area, have been obtained. The

percentage of births in hospitals to mothers who were residents of the urban area has increased from 49.7 in 1934 to 79.2 in 1945. The increase for mothers of the rural area was from 2.9 per cent in 1934 to 42.5 per cent in 1945. These increases in the percentages of births in hospitals are seen in Figure 12. It is evident that in both

TABLE V

FIGURE 12

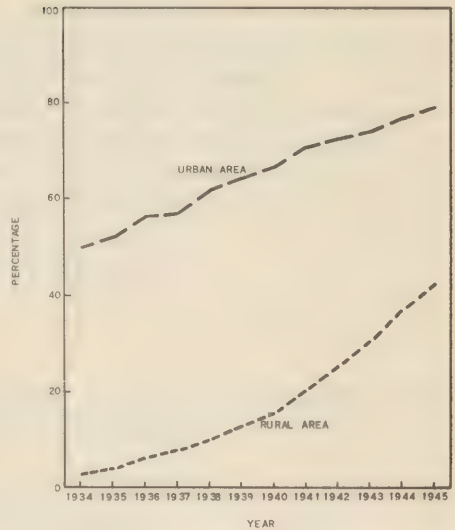
NUMBER AND PERCENTAGE OF BIRTHS OCCURRING
IN HOSPITALS IN TENNESSEE, 1934-1945

YEAR	BIRTHS	HOSPITAL BIRTHS	
		NUMBER	PER CENT
1934	52,351	7,674	14.7
1935	53,234	8,428	15.8
1936	50,514	9,536	18.9
1937	51,936	10,638	20.5
1938	53,667	12,348	23.0
1939	53,473	13,708	25.6
1940	55,669	16,662	29.9
1941	60,482	20,830	34.4
1942	66,367	26,223	39.5
1943	71,766	31,356	43.7
1944	69,799	34,200	49.0
1945	66,620	36,084	54.2

urban and rural areas hospital deliveries are increasing. Further increases will depend on the provision of hospital beds. For the approximately 30,000 births now occurring in homes, 1,200 hospital beds for obstetrics only would be required for hospitalization of these mothers at the time of delivery.

The percentage of births in hospitals has been obtained to show the use of hospitals by mothers resident of the counties of Tennessee (Figure 13). The variation in the

PERCENTAGE OF BIRTHS IN HOSPITALS ACCORDING
TO RESIDENCE OF MOTHER IN URBAN AND RURAL
AREAS OF TENNESSEE, 1934-1945

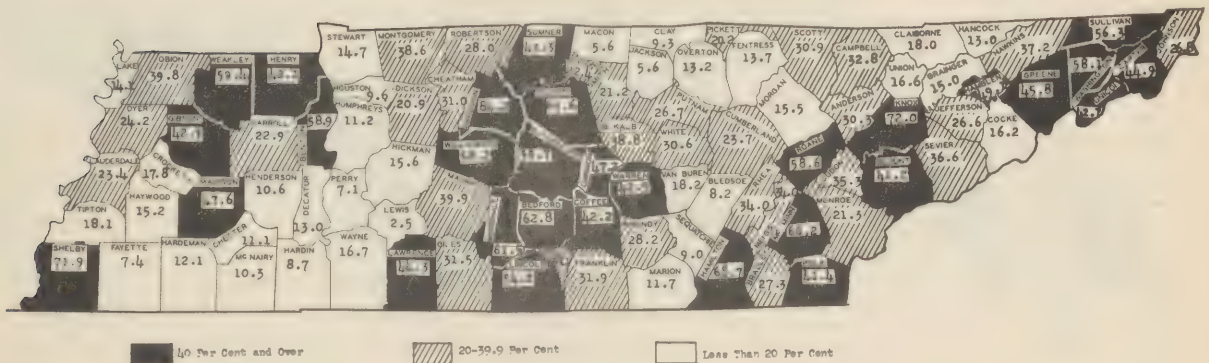


percentage was great, from 2.5 for Lewis County to 84.2 for Davidson County. Some mothers living in counties without hospitals had hospital deliveries by going to hospitals outside the county. Usually in such counties either a doctor or a midwife attended the delivery in the home.

Data are available for study of deaths in hospitals in 1944 and in 1937. In 1944, 9,251 deaths occurred in the hospitals of

FIGURE 13

PERCENTAGE OF BIRTHS IN HOSPITALS, BY COUNTIES
OF TENNESSEE 1944, RESIDENT DATA



The hospitals of Tennessee are used by residents of neighboring states, especially the hospitals in Memphis by persons from Arkansas and Mississippi. Of the 9,251 hospital deaths, 1,189 were of non-residents. There were 322 deaths of residents of Tennessee which occurred in hospitals outside of Tennessee. Considering only deaths of residents of Tennessee, 8,404 occurred in hos-

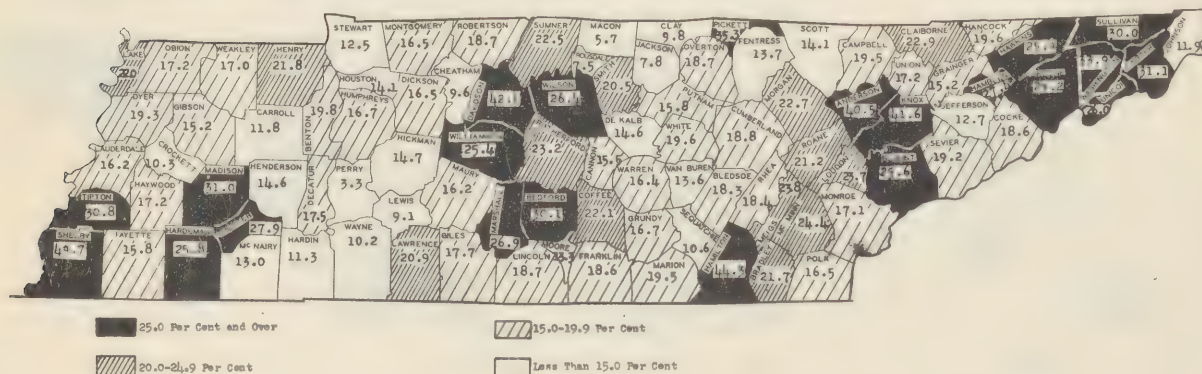
Although the number of deaths in hospitals has increased, this increase was not as great as for births in hospitals. Data regarding deaths of residents of Tennessee are available for 1937. In that year 6,882 of the deaths of residents of Tennessee occurred in hospitals or 23.5 per cent. The increase in deaths in hospitals has been greater for residents of the rural areas than for the urban areas of Tennessee from 1937 to 1944 (Table VI). The percentage of deaths in hospitals in the urban area is approaching 50 per cent.

NUMBER AND PERCENTAGE OF DEATHS OF RESIDENTS OF TENNESSEE IN HOSPITALS
FOR URBAN AND RURAL AREAS, 1937 AND 1944

AREA	TOTAL DEATHS	1937		1944		
		HOSPITAL NUMBER	DEATHS PER CENT	TOTAL DEATHS	HOSPITAL NUMBER	DEATHS PER CENT
TOTAL	29,330	6,882	23.5	27,652	8,404	30.4
URBAN	9,928	4,189	42.2	9,532	4,290	45.0
RURAL	19,402	2,693	13.9	18,120	4,114	22.7

see were in general hospitals. In the urban area in 1944, 3,595 or 37.7 per cent of the total deaths occurred in general hospitals. The percentage of deaths in the rural area in general hospitals was 19.2. Thus there

PERCENTAGE OF RESIDENT DEATHS OCCURRING IN HOSPITALS,
BY COUNTIES OF TENNESSEE, 1944



can be considerable increase in hospital deaths of residents of the rural area if general hospital beds are available for use of residents of the rural area.

The percentage of deaths in hospitals has been obtained to show the use of hospitals by residents of the counties of Tennessee (Figure 14). Only in the large city-counties of Davidson, Hamilton, Knox and Shelby and in Anderson County which has a new hospital for workers at Oak Ridge were the percentages over 40. In Shelby County nearly 50 per cent (49.7) of the deaths of residents were in hospitals. In several

counties the percentages of deaths in hospitals were small indicating that hospital care was probably not available for the sick persons in those areas.

Deaths in hospitals have been studied according to cause of death (Table VII). There was considerable variation in the percentages of the deaths in hospitals for the specific causes. The percentages for some diseases such as tuberculosis, 31.1, pneumonia, 30.9, and diphtheria, 46.8 were too low and indicate that hospital facilities are needed for care of the sick and prevention of some of the deaths.

TABLE VII

NUMBER AND PERCENTAGE OF DEATHS IN HOSPITALS BY CAUSE FOR TENNESSEE, 1944

CAUSE OF DEATH	TOTAL DEATHS	DEATHS IN HOSPITALS NUMBER	PER CENT	CAUSE OF DEATH	TOTAL DEATHS	DEATHS IN HOSPITALS NUMBER	PER CENT
ALL CAUSES	28,619	9,251	32.3	OTHER RESPIRATORY DISEASES	297	109	36.7
TYPHOID AND PARATYPHOID FEVER	11	7	63.6	DIARRHEA AND ENTERITIS, UNDER 2 YRS.	396	177	44.7
MENINGOCOCCUS MENINGITIS	86	69	80.2	DIARRHEA AND ENTERITIS, 2 YRS. AND OVER	89	29	32.6
WHOOPING COUGH	63	12	19.0	APPENDICITIS	178	155	87.1
DIPHTHERIA	47	22	46.8	HERNIA, INTESTINAL OBSTRUCTION	270	209	77.4
TUBERCULOSIS, ALL FORMS	1,883	586	31.1	OTHER DISEASES OF THE DIGESTIVE SYSTEM	734	378	51.5
DYSENTERY	65	25	38.5	NEPHRITIS	1,827	421	23.0
SYPHILIS, ALL FORMS	348	255	73.3	OTHER DISEASES OF THE GENITO-URINARY SYSTEM	393	255	64.9
INFLUENZA	662	78	11.8	DISEASES OF PREGNANCY, CHILDBIRTH AND PUERPERIUM	191	134	70.2
MEASLES	69	13	18.8	CONGENITAL MALFORMATIONS AND DISEASES PECULIAR TO THE FIRST YEAR OF LIFE	1,641	944	57.5
POLIOMYELITIS	18	10	55.6	SENILITY	348	68	19.5
OTHER INFECTIOUS AND PARASITIC DISEASES	153	83	54.2	SUICIDE	200	52	26.0
CANCER, ALL FORMS	2,651	817	30.8	HOMICIDE	311	133	42.8
ACUTE RHEUMATIC FEVER	44	18	40.9	MOTOR VEHICLE ACCIDENTS	477	250	52.4
DIABETES MELLITUS	380	179	47.1	OTHER ACCIDENTAL DEATHS	1,399	528	37.7
PELLAGRA	83	12	14.5	ALL OTHER DEFINED CAUSES	588	282	48.0
CEREBRAL HEMORRHAGE, EMBOLISM, ETC.	2,741	619	22.6	ILL-DEFINED AND UNKNOWN CAUSES	1,297	171	13.2
OTHER DISEASES OF THE NERVOUS SYSTEM	442	228	51.6				
DISEASES OF THE HEART	6,122	1,237	20.2				
DISEASES OF THE ARTERIES	370	147	39.7				
OTHER DISEASES OF THE CIRCULATORY SYSTEM	110	34	30.9				
PNEUMONIA	1,635	505	30.9				

E. ATTENDANCE AT BIRTH BY MIDWIVES

In recent years there has been an increase in the use of hospitals for delivery. At the same time there has been a decrease in births attended by midwives. Although 5,039 births were attended by midwives in 1945, it is expected that this number will decrease if the trend of recent years continues. In Table VIII the numbers and percentages of births attended by midwives by years from 1933 to 1945 are given.

In 1933, 7,376 or 14.7 per cent of the births were attended by midwives while in 1945, 5,039 or 7.6 per cent were attended by midwives.

The attendance at birth by midwives has almost been discontinued in the urban area for in 1944 only 359 or 2.0 per cent of these births were attended by midwives.

TABLE VIII

NUMBER AND PERCENTAGE OF BIRTHS ATTENDED BY MIDWIVES IN TENNESSEE, 1933-1945

YEAR	BIRTHS	ATTENDED BY MIDWIVES	
		NUMBER	PER CENT
1933	50,039	7,376	14.7
1934	52,351	7,168	13.7
1935	53,234	6,976	13.1
1936	50,514	6,641	13.1
1937	51,936	6,312	12.2
1938	53,667	6,013	11.2
1939	53,473	5,548	10.4
1940	55,669	6,029	10.8
1941	60,482	6,165	10.2
1942	66,367	6,326	9.5
1943	71,766	6,217	8.7
1944	69,799	5,577	8.0
1945	66,620	5,039	7.6

TABLE IX

NUMBER AND PERCENTAGE OF BIRTHS ATTENDED BY MIDWIVES FOR URBAN AND RURAL AREAS, BY COLOR, RESIDENT DATA, 1944

AREA	TOTAL			WHITE			COLORED		
	TOTAL BIRTHS	ATTENDED BY MIDWIVES NUMBER	PER CENT	TOTAL BIRTHS	ATTENDED BY MIDWIVES NUMBER	PER CENT	TOTAL BIRTHS	ATTENDED BY MIDWIVES NUMBER	PER CENT
URBAN AREA	18,085	359	2.0	13,288	96	0.7	4,795	262	5.5
RURAL AREA	49,015	5,185	10.6	43,069	2,838	6.6	5,936	2,342	39.5

In rural areas, however, 5,185 or 10.6 per cent of the births were attended by midwives (Table IX). The percentage of colored births in the rural area attended by midwives (39.5) was high.

There were two areas in the state where relatively large proportions of the births were attended by midwives (Figure 15). One of these sections was in West Tennessee in the counties with large proportions of the population colored. For Fayette County, the percentage was 65.2 for 1944 and for Haywood, 51.8 for 1944. In this area with a large Negro population there are Negro midwives attending births. The other section included several mountainous counties on the Cumberland Plateau. For Fentress County the percentage was 36.3 in 1944. In this area there are white midwives attending births.

F. MEDICAL, DENTAL AND NURSING PERSONNEL

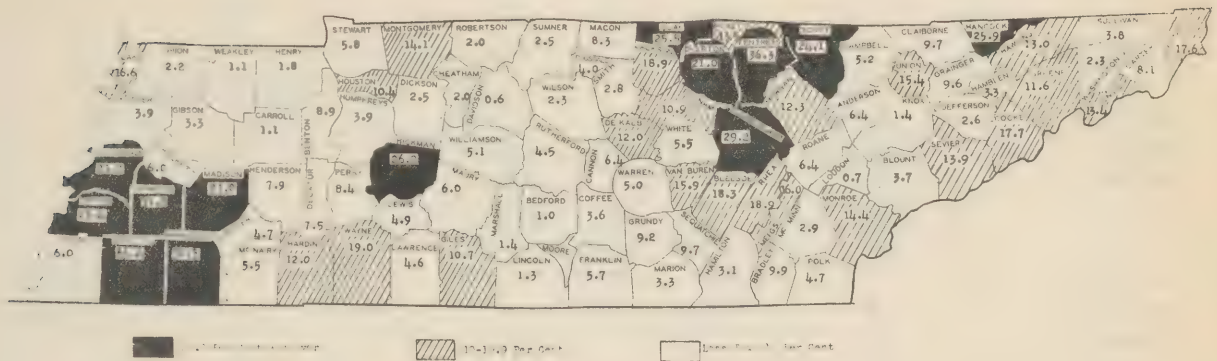
In considering provision of hospital and health department facilities, personnel available at present and needed in the future for a satisfactory program is important. In this section of the report data regarding medical, dental and nursing personnel in Tennessee are presented.

For the Study of Child Health Services of the American Academy of Pediatrics, data* were assembled for physicians and dentists in private practice in Tennessee. An effort was made to obtain information regarding all physicians and dentists in private practice in Tennessee in the late spring and summer of 1946. Physicians and

* Preliminary statistical data to be published by American Academy of Pediatrics, quoted with permission of Chairman for Tennessee.

FIGURE 15

PERCENTAGE OF BIRTHS ATTENDED BY MIDWIVES, BY COUNTIES OF TENNESSEE, 1944



dentists engaged solely in institutional, industrial or public health work and in university teaching were excluded. With these exclusions there were found to be only 1,626 physicians and 809 dentists in private practice in Tennessee. The numbers of physicians and dentists in private practice with rates per 10,000 population are given by counties in Table X and the rates are shown in Figures 16 and 17.

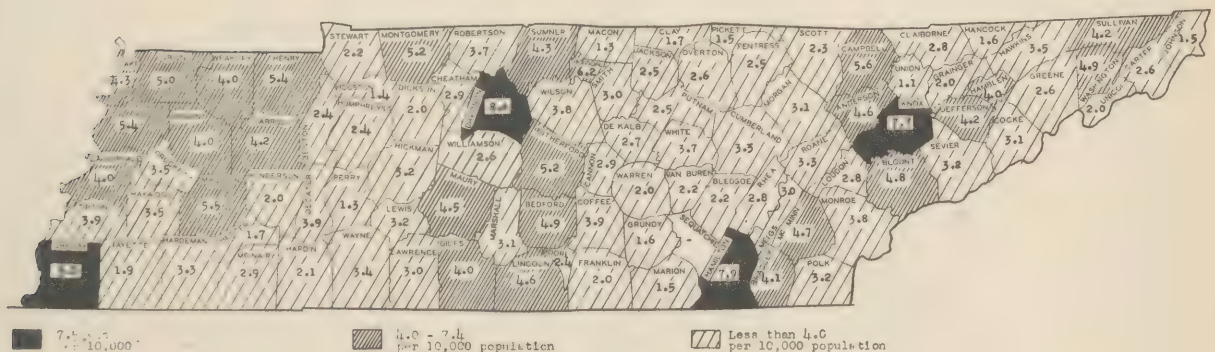
On the basis of the population of Tennessee, there were 5.2 physicians in private practice per 10,000 population or one for 1910 people. Over half of these

physicians were located in the four large city-counties, Davidson, Hamilton, Knox and Shelby. For these metropolitan counties there were 8.5 physicians per 10,000 population. In the rest of the state there were only 732 physicians or 3.6 per 10,000 population. In many of the rural poorer counties the medical service available was limited with only one or two doctors for 10,000 people.

There were 809 dentists in private practice or 2.6 per 10,000 population. In the large city-counties there were 455 dentists or 4.3 per 10,000 population while in

FIGURE 16

PHYSICIANS IN PRIVATE PRACTICE PER 10,000 POPULATION BY COUNTY.
STUDY OF CHILD HEALTH SERVICES, TENNESSEE, 1946



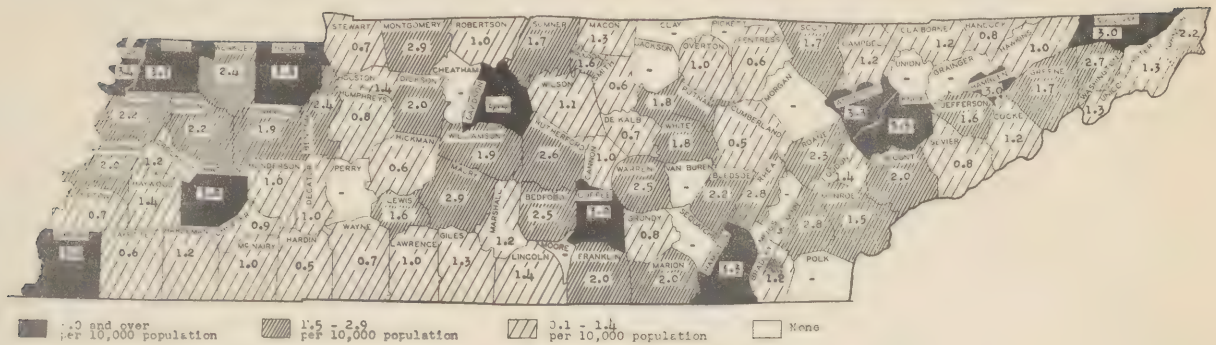
PHYSICIANS AND DENTISTS IN PRIVATE PRACTICE WITH RATES PER 10,000 POPULATION
BY COUNTY, STUDY OF CHILD HEALTH SERVICES*, TENNESSEE, 1946

COUNTY	PHYSICIANS NUM- BER	RATE	DENTISTS NUM- BER	RATE	COUNTY	PHYSICIANS NUM- BER	RATE	DENTISTS NUM- BER	RATE
TOTAL	1,626	5.2	809	2.6	LAKE	5	4.3	4	3.4
ANDERSON	14	4.6	10	3.3	LAUDERDALE	10	4.0	5	2.0
BEDFORD	12	4.9	6	2.5	LAWRENCE	9	3.0	3	1.0
BENTON	3	2.4	3	2.4	LEWIS	2	3.2	1	1.6
BLED SOE	2	2.2	2	2.2	LINCOLN	13	4.6	4	1.4
BLOUNT	22	4.8	9	2.0	LOUDON	6	2.8	3	1.4
BRADLEY	13	4.1	4	1.2	MACON	2	1.3	2	1.3
CAMPBELL	19	5.6	4	1.2	MCMINN	15	4.7	9	2.8
CANNON	3	2.9	1	1.0	MCNAIRY	6	2.9	2	1.0
CARROLL	11	4.2	5	1.9	MADISON	31	5.5	17	3.0
CARTER	10	2.6	5	1.3	MARION	3	1.5	4	2.0
CHEATHAM	3	2.9	0	-	MARSHALL	5	3.1	2	1.2
CHESTER	2	1.7	1	0.9	MAURY	20	4.5	13	2.9
CLAIBORNE	7	2.8	3	1.2	MEIGS	2	3.0	0	-
CLAY	2	1.7	0	-	MONROE	10	3.8	4	1.5
COCKE	8	3.1	3	1.2	MONTGOMERY	18	5.2	10	2.9
COFFEE	8	3.9	6	3.0	MOORE	1	2.4	0	-
CROCKETT	6	3.5	2	1.2	MORGAN	5	3.1	0	-
CUMBERLAND	6	3.3	1	0.5	OBION	16	5.0	12	3.7
DAVIDSON	240	8.6	122	4.4	OVERTON	5	2.8	2	1.0
DECATUR	4	3.9	1	1.0	PERRY	1	1.3	0	-
DEKALB	4	2.7	1	0.7	PICKETT	1	1.5	0	-
DICKSON	4	2.0	4	2.0	POLK	5	3.2	0	-
DYER	20	5.4	8	2.2	PUTNAM	7	2.5	5	1.8
FAYETTE	6	1.9	2	0.6	RHEA	5	2.8	5	2.8
FENTRESS	4	2.5	1	0.6	ROANE	10	3.3	7	2.3
FRANKLIN	5	2.0	5	2.0	ROBERTSON	11	3.7	3	1.0
GIBSON	18	4.0	10	2.2	RUTHERFORD	18	5.2	9	2.6
GILES	12	4.0	4	1.3	SCOTT	4	2.3	3	1.7
GRAINGER	3	2.0	0	-	SEQUATCHIE	0	-	0	-
GREENE	11	2.6	7	1.7	SEVIER	8	3.2	2	0.8
GRUNDY	2	1.6	1	0.8	SHELBY	352	9.0	201	5.1
HAMBLEN	8	4.0	6	3.0	SMITH	5	3.0	1	0.6
HAMILTON	153	7.9	64	3.3	STEWART	3	2.2	1	0.7
HANCOCK	2	1.6	1	0.6	SULLIVAN	34	4.2	24	3.0
HARDEMAN	8	3.3	3	1.2	SUMNER	15	4.3	6	1.7
HARDIN	4	2.1	1	0.5	TIPTON	11	3.9	2	0.7
HAWKINS	11	3.5	3	1.0	TROUSDALE	4	8.2	1	1.6
HAYWOOD	10	3.5	4	1.4	UNICOI	3	2.0	2	1.3
HENDERSON	4	2.0	2	1.0	UNION	1	1.1	0	-
HENRY	14	5.4	9	3.5	VAN BUREN	1	2.2	0	-
HICKMAN	5	3.2	1	0.6	WARREN	4	2.0	5	2.5
HOUSTON	1	1.4	1	1.4	WASHINGTON	27	4.9	15	2.7
HUMPHREYS	3	2.4	1	0.8	WAYNE	5	3.4	1	0.7
JACKSON	4	2.5	0	-	WEAKLEY	12	4.0	7	2.4
JEFFERSON	8	4.2	3	1.6	WHITE	6	3.7	3	1.8
JOHNSON	2	1.5	3	2.2	WILLIAMSON	7	2.6	5	1.9
KNOX	149	7.7	68	3.5	WILSON	10	3.8	3	1.1
					COUNTY UNKNOWN	2		0	-

* Preliminary statistical data to be published by American Academy of Pediatrics, quoted with permission of Chairman for Tennessee.

FIGURE 17

DENTISTS IN PRIVATE PRACTICE PER 10,000 POPULATION BY COUNTY.
STUDY OF CHILD HEALTH SERVICES, TENNESSEE, 1946



the rest of the state there were only 354 or 1.7 per 10,000 population. Thirteen counties were without a dentist.

To obtain data regarding nurses, the Directory of Registered Nurses of Tennessee of the Committee on Nursing Education and Nursing Practice for 1945-1946 was used. There were 5,234 nurses listed in the directory. Of these, 1,643 gave addresses in other states. Many of these nurses living in other states (463) were not in active nursing, 446 had governmental positions and 294 were engaged in institutional nursing.

The number of registered nurses with Tennessee addresses was 3,591 and of these, 548 were not in active nursing. The type of nursing of the 3,043 nurses believed to be active in nursing at present in Tennessee is given in Table XI.

More nurses were working in institutions, which include the hospitals, than in any other type of nursing. There were 794 nurses in private duty. Based on the population of Tennessee, the number of private duty nurses was 2.6 per 10,000 population. Nearly all of these registered nurses in

TABLE XI

REGISTERED NURSES WITH TENNESSEE ADDRESSES ACCORDING TO TYPE OF NURSING
WITH RATES PER 10,000 POPULATION FOR FOUR LARGE CITY-COUNTIES
AND THE REST OF THE STATE

TYPE OF NURSING	TOTAL		FOUR LARGE CITY-COUNTIES		REST OF STATE	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
TOTAL	3,043	10.0	2,153	20.9	890	4.4
INSTITUTIONAL	904	3.0	655	6.4	249	1.2
PRIVATE DUTY	794	2.6	677	6.6	117	0.6
OFFICE NURSING	170	0.6	119	1.2	51	0.3
GOVERNMENT	314	1.0	193	1.9	121	0.6
MISCELLANEOUS	111	0.4	85	0.8	26	0.1
INDUSTRIAL	195	0.6	97	0.9	98	0.5
PUBLIC HEALTH	310	1.0	209	2.0	101	0.5
UNKNOWN	245	0.8	118	1.1	127	0.6

private duty (85 per cent) were living in the four large city-counties. Only 117 private duty nurses were living in the remaining area of Tennessee or approximately one per 17,000 people.

Of the 3,043 registered nurses, 2,153 or 71 per cent were living in the four large city-counties. The rate per 10,000 population was 20.9. Only 890 or 4.4 per 10,000 population were rendering service to the rest of the population of Tennessee.

For use in planning for extension of hospital facilities the number of nurses now working in hospitals and rendering private duty has been obtained. In Table XII the number of these nurses and also the number of nurses in public health and industrial nursing are given by counties. Nurses who did not report type of nursing are believed to be in active practice and are included in group of nurses in hospitals, private duty, etc.

The numbers of nurses in public health work, 310, and in industrial nursing, 195, were small. The public health nurses were

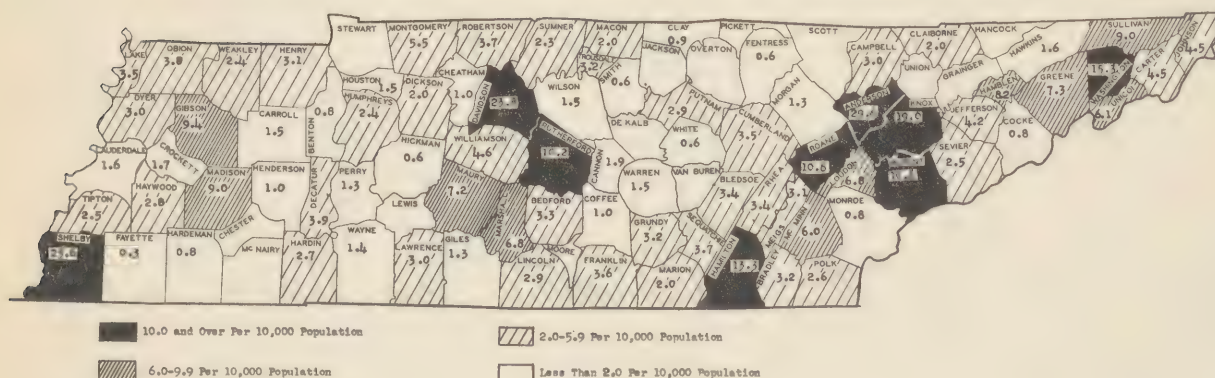
working in the health departments as given in Section II. The addresses of a few were in counties without health departments at the time of this survey. These nurses temporarily probably were not in active public health nursing at that time. The distribution of the 195 industrial nurses is given below:

Anderson	14	Hawkins	1	Polk	1
Blount	11	Johnson	1	Roane	6
Carter	4	Knox	24	Robertson	2
Coffee	1	Lawrence	1	Shelby	31
Cumberland	1	Loudon	3	Sullivan	21
Davidson	23	Madison	5	Sumner	1
Dyer	2	Marion	1	Tipton	1
Franklin	1	Marshall	4	Washington	4
Gibson	8	Maury	1	Weakley	1
Hamilton	19	Obion	1	Wilson	1

Although nearly half, 97, were found in the large city-counties, 98 were working in other areas with industrial plants. Anderson, Blount and Sullivan were three other counties with large industries where many industrial nurses were employed.

FIGURE 18

REGISTERED NURSES PER 10,000 POPULATION BY COUNTIES OF TENNESSEE FROM 1945-1946 DIRECTORY



The number of registered nurses per 10,000 population is given by counties in Figure 18.

The concentration of nurses in the large city-counties and other counties with

cities or industrial plants is evident from this figure. There were 14 counties without a registered nurse and ten other counties with less than one nurse per 10,000 population.

TABLE XI

REGISTERED NURSES* WITH TENNESSEE ADDRESSES ACCORDING TO TYPE OF NURSING
WITH RATES PER 10,000 POPULATION BY COUNTIES OF TENNESSEE

COUNTY	TOTAL		HOSPITAL, PRI- VATE DUTY OF- FICE NURSING		PUB. HEALTH AND INDUS. NURSING		COUNTY	TOTAL		HOSPITAL, PRI- VATE DUTY OF- FICE NURSING		PUB. HEALTH AND INDUS. NURSING	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE		NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
TOTAL	3,043	10.0	2,538	8.3	505	1.7	LAKE	4	3.5	2	1.7	2	1.7
ANDERSON	87	29.6	69	23.5	18	6.1	LAUDERDALE	4	1.6	2	0.8	2	0.8
BEDFORD	8	3.3	5	2.1	3	1.2	LAWRENCE	9	3.0	8	2.7	1	0.3
BENTON	1	0.8	1	0.8	-	-	LEWIS	-	-	-	-	-	-
BLED SOE	3	3.4	1	1.1	2	2.3	LINCOLN	8	2.9	7	2.5	1	0.4
BLOUNT	47	10.6	35	7.9	12	2.7	LOUDON	14	6.8	11	5.3	3	1.4
BRADLEY	10	3.2	7	2.3	3	1.0	MACON	3	2.0	1	0.7	2	1.3
CAMPBELL	10	3.0	9	2.7	1	0.3	MC MINN	19	6.0	17	5.4	2	0.6
CANNON	2	1.9	2	1.9	-	-	MC NAIRY	-	-	-	-	-	-
CARROLL	4	1.5	4	1.5	-	-	MADISON	50	9.0	41	7.4	9	1.6
CARTER	17	4.5	12	3.2	5	1.3	MARION	4	2.0	3	1.5	1	0.5
CHEATHAM	1	1.0	-	-	1	1.0	MARSHALL	11	6.8	6	3.7	5	3.1
CHESTER	-	-	-	-	-	-	MAURY	31	7.2	28	6.5	3	0.7
CLAIBORNE	5	2.0	5	2.0	-	-	MEIGS	2	3.1	2	3.1	-	-
CLAY	1	0.9	1	0.9	-	-	MONROE	2	0.8	2	0.8	-	-
COCKE	2	0.8	1	0.4	1	0.4	MONTGOMERY	19	5.5	17	4.9	2	0.6
COFFEE	2	1.0	1	0.5	1	0.5	MOORE	-	-	-	-	-	-
CROCKETT	3	1.7	2	1.2	1	0.6	MORGAN	2	1.3	2	1.3	-	-
CUMBERLAND	6	3.5	5	2.9	1	0.6	OBION	12	3.8	10	3.1	2	0.6
DAVIDSON	646	23.8	556	20.4	90	3.3	OVERTON	-	-	-	-	-	-
DECATUR	4	3.9	4	3.9	-	-	PERRY	1	1.3	1	1.3	-	-
DEKALB	-	-	-	-	-	-	PICKETT	-	-	-	-	-	-
DICKSON	4	2.0	4	2.0	-	-	POLK	4	2.6	3	1.9	1	0.6
DYER	11	3.0	9	2.5	2	0.5	PUTNAM	8	2.9	8	2.9	-	-
FAYETTE	1	0.3	1	0.3	-	-	RHEA	6	3.4	5	2.9	1	0.6
FENTRESS	1	0.6	1	0.6	-	-	ROANE	31	10.6	25	8.6	6	2.1
FRANKLIN	9	3.6	7	2.8	2	0.8	ROBERTSON	11	3.7	8	2.7	3	1.0
GIBSON	42	9.4	24	5.4	18	4.0	RUTHERFORD	35	10.2	28	8.2	7	2.0
GILES	4	1.3	4	1.3	-	-	SCOTT	-	-	-	-	-	-
GRAINGER	-	-	-	-	-	-	SEQUATCHIE	2	3.7	2	3.7	-	-
GREENE	30	7.3	29	7.0	1	0.2	SEVIER	6	2.5	3	1.2	3	1.2
GRUNDY	4	3.2	4	3.2	-	-	SHELBY	897	23.6	786	20.7	111	2.9
HAMBLEN	16	8.2	15	7.7	1	0.5	SMITH	1	0.6	1	0.6	-	-
HAMILTON	252	13.3	204	10.8	48	2.5	STEWART	-	-	-	-	-	-
HANCOCK	-	-	-	-	-	-	SULLIVAN	69	9.0	38	5.0	31	4.0
HARDEMAN	2	0.8	2	0.8	-	-	SUMNER	8	2.3	3	0.9	5	1.5
HARDIN	5	2.7	5	2.7	-	-	TIPTON	7	2.5	4	1.4	3	1.1
HAWKINS	5	1.6	3	1.0	2	0.7	TROUSDALE	2	3.2	1	1.6	1	1.6
HAYWOOD	8	2.8	7	2.5	1	0.4	UNICOI	9	6.1	8	5.4	1	0.7
HENDERSON	2	1.0	2	1.0	-	-	UNION	-	-	-	-	-	-
HENRY	8	3.1	6	2.3	2	0.8	VAN BUREN	-	-	-	-	-	-
HICKMAN	1	0.6	-	-	1	0.6	WARREN	3	1.5	2	1.0	1	0.5
HOUSTON	1	1.5	1	1.5	-	-	WASHINGTON	83	15.3	73	13.5	10	1.8
HUMPHREYS	3	2.4	2	1.6	1	0.8	WAYNE	2	1.4	2	1.4	-	-
JACKSON	-	-	-	-	-	-	WEAKLEY	7	2.4	4	1.4	3	1.0
JEFFERSON	8	4.2	8	4.2	-	-	WHITE	1	0.6	1	0.6	-	-
JOHNSON	6	4.5	4	3.0	2	1.5	WILLIAMSON	12	4.6	7	2.7	5	1.9
KNOX	358	19.0	301	16.0	57	3.0	WILSON	4	1.5	3	1.2	1	0.4

* Registered Nurses, September 1945-1946, Committee on Nursing Education and Nursing Practice.

DISCUSSION

In this section of the report, data have been presented which show a growing state with an 11.4 per cent increase in the population in the ten-year period from 1930 to 1940. In East Tennessee a relatively high proportion of the population was young and the birth rates were high. There were sparsely populated areas as well as densely populated large city-counties. Data regarding county taxes and effective buying income revealed that there were wide variations in financial resources from very poor counties to relatively wealthy ones. Some counties might be unable to finance hospi-

tals and health facilities while others would be able to provide such facilities. The increase in births in hospitals indicated that in both urban and rural areas mothers were rapidly becoming accustomed to the use of hospitals for delivery and added facilities would be required. A rapid change has been noted from attendance at birth by midwives to attendance at birth by doctors in hospitals. The distribution of doctors, dentists and nurses indicated that in conjunction with planning of hospitals and health facilities plans needed to be made for securing the services of these groups for the population of rural areas.

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HOSPITAL AND HEALTH DEPARTMENT FACILITIES AND NEEDS IN TENNESSEE

IV. HOSPITAL AND HEALTH DEPARTMENT NEEDS IN TENNESSEE

In the preceding three sections of this report, the existing conditions in regard to hospitals, health departments, physicians, dentists, nurses, etc. have been presented. Planning for health and hospital services necessitates consideration of all these services and their relation to each other for the development of a program for Tennessee. The provisions and regulations of the Hospital Survey and Construction Act (Public Law 725, 79th Congress) and the needs in Tennessee will be discussed in this section.

The different types of areas involved are recognized in the regulations with three types considered; namely, (1) the base area, (2) the intermediate area and (3) the rural area. The definitions of these areas taken from the regulations for the Hospital Survey and Construction Act are as follows:

1. A base area is an area with a teaching hospital of a medical school or an area with at least 100,000 population and one general hospital with complement of 200 or more beds for general use.
2. An intermediate area has a population of 25,000 or more, and, on completion of the hospital construction program, would have at least one general hospital of 100 beds suitable for a district hospital in a coordinated hospital system.
3. The rural area is the remaining area, no part of which is included in a base or intermediate area.

In addition to the subdivision of the state into base, intermediate and rural areas, it is necessary to divide the state into regions, with each region containing a base area, several intermediate and rural areas. Tennessee can be divided logically into four regions with the counties contain-

ing the large cities of Chattanooga, Knoxville, Memphis and Nashville being the base areas of the four regions. This regional division is planned in view of an integrated hospital system in which diagnostic and treatment facilities are available to all. In such a system, specialists would be loaned for consultative services from the larger teaching hospitals to the smaller intermediate or rural area hospitals. Also in such a system patients requiring specialized observation and treatment would be transferred from the smaller to the larger hospitals in which all types of services would be provided. On this regional basis, the extension of medical knowledge and resources to smaller hospitals and to areas without resources could be carried out.

A. GENERAL HOSPITALS

As shown in the first section of this report, from the survey of hospitals there were 101 general hospitals with 6,229 beds at the time of the survey. The maximum state allowance for general hospital beds for Tennessee on the basis of the regulations was 4.5 per 1,000 population. On the basis of November 1, 1943 population, 12,682 beds in general hospitals would be permissible. To obtain this number, 6,453 additional general hospital beds would need to be constructed.

The existing general hospitals were unevenly distributed over the state. In 42 counties, there were no general hospitals, in 16 others there was less than one general hospital bed per 1,000 population and in 21 others there were less than two beds per 1,000 population. Thus, at least 79 counties are in great need of general hospital beds.

Standards were established for the base areas, 4.5 beds per 1,000 population; for the intermediate areas, 4.0 beds per

1,000 population; and for the rural areas, 2.5 beds per 1,000 population. The difference in the number of beds according to the standard for the rural area, 2.5 per 1,000 and the number needed for the population, 4.5 per 1,000, would be provided in hospitals in the intermediate or base areas. A similar provision for beds in base areas for the population of intermediate areas would be made.

Methods of estimating needs and planning for hospital beds considering births and deaths have been given in the Report of Michigan Hospital Survey*, Hospital Resources and Needs, which was a pilot study made by the Commission on Hospital Care. From the study of hospital beds needed for delivery, it was estimated that four beds at 75 per cent occupancy were needed for each 100 births in hospitals per year.

The number of hospital births in Tennessee has increased in the past twelve years with 54.2 per cent of the births occurring in hospitals in 1945. If the trend continues and if hospital beds are needed for 80 per cent of the births in Tennessee in 1952, between 800 and 900 additional beds would be required for obstetrics alone. The most logical placing of such general hospital beds would be in county seats in the centers of population. As the use of hospitals for delivery increases, beds for obstetrical care will be needed in all or nearly all of the counties. The needs by 1952 can be estimated, considering the birth rate and expected hospital births.

According to the Michigan study, for the country as a whole the public uses about 250 days of general hospital care for each death and correlated sickness (including obstetrics) or 0.7 beds per death. If 50 per cent of all deaths occur in general hospitals, and this is expected with provision of hospital facilities, and if the death rate is 10.0 per 1,000 population, there would be 5.0 deaths per 1,000 population in general hospitals. Using 0.7 beds needed per death in general hospitals, 3.5 beds would be needed for each 1,000 population. As each bed cannot be kept occupied

and as the occupancy of hospitals varies considerably, only 75 per cent occupancy can be expected for beds in large hospitals. Using 75 per cent occupancy the needed hospital beds would be 4.7 per 1,000 population ($3.5/0.75 = 4.7$). These findings have been used in developing standards which have been incorporated into the hospital planning and into the regulations.

Estimation of needs for general hospital beds in small areas by this method is difficult because of incompleteness of registration of deaths in many rural counties. However, with consideration of the many variables involved, it may be useful in determining individual local needs.

The size of general hospitals is of concern in planning for facilities in rural areas. Several factors have to be balanced against each other in arriving at the size of hospital most suitable for the particular area.

Seasonal and other variations in the use of hospital beds is to be expected. From the study of actual findings of hospital occupancy as released in the Michigan report referred to above it was assumed that a "hospital should have an average number of vacant beds equal to about four times the square root of the average daily census." Thus the relationship between number of beds and average daily census can be expressed by the formulae:

$$\text{Number of beds} = \text{average daily census} + 4\sqrt{\text{average daily census}}$$

$$\text{The percentage occupancy} = \frac{\text{average daily census}}{\text{number of beds}} \times 100$$

Using this relationship, the average daily census and the percentage occupancies have been calculated for hospitals of various sizes and the results are given in Table I.

The small hospitals with 30, 40, or 50 beds would be expected to have a lower percentage occupancy than the large hospitals. This is a factor to be considered in planning the size of hospitals. With a low percentage occupancy the income from patients per bed would naturally be less than in hospitals with high percentage occupancy.

The small hospital, however, under

* Hospital Resources and Needs, Report of the Michigan Hospital Survey, W. K. Kellogg Foundation, Battle Creek, Michigan, 1946.

TABLE I

EXPECTED AVERAGE DAILY CENSUS AND
PERCENTAGE OCCUPANCY ACCORDING TO NUMBER
OF BEDS OF HOSPITAL

BEDS	AVERAGE DAILY CENSUS	PERCENTAGE OCCUPANCY
30	14.7	49.0
40	21.5	53.8
50	28.6	57.2
60	36.0	60.0
70	43.6	62.3
80	51.3	64.1
90	59.2	65.8
100	67.2	67.2
200	150.9	75.4

certain conditions may be constructed and operated at a smaller cost per bed than the large hospital. This is due to the fact that usually the larger hospitals have more diagnostic aids such as X-ray facilities, basal metabolism equipment, electrocardiograph, encephalograph, laboratory facilities, etc. which increases the cost.

The fact must be known and recognized by the people wishing small inexpensive hospitals that there will be a sacrifice in medical facilities. Complete diagnostic services and expensive equipment and treatments cannot be included in the small hospital.

Until recent years, it was felt that special diseases such as the communicable diseases, cardiac diseases, etc. required special hospitals. The modern thinking in this respect is that these patients can be as well and probably better cared for in general hospitals or in buildings erected as part of the general hospital. Through this arrangement, all these specialized services of the general hospital can be utilized as needed for the patient with special problem. By this arrangement the duplication of expensive equipment is eliminated.

B. NERVOUS AND MENTAL HOSPITALS

At the time of the survey, there were nine hospitals for nervous and mental patients with 6,748 beds. Three of these hos-

pitals with 6,308 beds were state-owned hospitals for the care of mental patients. The maximum allowance for beds in mental hospitals according to the regulations was five beds per 1,000 population. Based on the November 1, 1943 population of Tennessee, 14,091 beds would be permissible.

In planning for new nervous and mental hospitals, the regulations require that they be constructed near general hospitals. The regulation states: "Whenever practicable, mental hospitals receiving grants under the Federal Act shall be located in centers of population and in proximity to general hospitals." By such an arrangement, the facilities of the general hospital may be utilized when needed for patients in the nervous and mental hospital.

Some of the beds needed for nervous and mental patients should be in psychopathic and psychiatric wards in or attached to general hospitals. Beds are needed for patients not frankly psychotic, for the borderline cases for whom modern treatment and mental hygiene may be beneficial. In many instances such treatment may prevent the potential psychotic individual from continuing into a psychotic case thereby preventing a later admission to a mental hospital. The need in Tennessee, at present, is for the establishment of such facilities in or attached to general hospitals.

C. TUBERCULOSIS HOSPITALS

The facilities in Tennessee for treatment of tuberculosis patients were extremely limited at the time of the survey. There were seven tuberculosis hospitals with 1,091 beds. Of these only two hospitals with 86 beds in all were owned by the state.

The standard for beds in tuberculosis hospitals has been set at 2.5 beds per death for the five-year period, 1940-1944. For that period the average number of deaths per year was 2,097. Thus, 5,242 beds for tuberculosis patients would be required under this standard. Actually, this standard is 4.8 times the number of existing beds.

The Tennessee legislature has recognized the need for beds for tuberculosis patients and for appropriations for con-



struction of state-owned hospitals. A tuberculosis hospital plan has been developed and appropriations made by the legislature. A 400 bed hospital for West Tennessee is now under construction in Memphis. Three additional state-owned hospitals for tuberculosis are planned, one in Chattanooga with 120 beds, one in Knoxville with 180 beds and one in Nashville with approximately 150 beds. Thus in all, the plans for construction of tuberculosis hospitals would increase the hospital beds from 1,091 to approximately 1,941. Even with this construction, there would be only 0.9 beds per death, based on the average number of deaths for the five-year period, 1940-1944.

The location of tuberculosis hospitals receiving grants under the Federal Act is designated according to regulations as follows: "Whenever practicable, tuberculosis hospitals receiving grants under the Federal Act shall be built in centers of population and in proximity to general hospitals." The desirability of locating tuberculosis hospitals near general hospitals, in a hospital and medical center, was part of the original planning of the Tennessee Tuberculosis Hospital Commission several years ago. The tuberculosis hospital in Memphis is being constructed close to John Gaston Hospital, a general hospital with 489 beds. The hospital for Chattanooga will be located in a hospital center. In Nashville, it is hoped to have the tuberculosis hospital constructed on land across the street from Vanderbilt Hospital, a general hospital with 340 beds which is also a teaching center.

The location of the tuberculosis hospital adjacent to the general hospital has several valuable advantages. Training and experience for the interns and residents of the general hospital can be arranged. The general hospital facilities can be utilized when necessary for tuberculosis patients. The tuberculosis hospital can become a center for consultation service with private physicians. The hospital is also readily accessible for supplies, for out-patient clinics, and for relatives and friends.

D. CHRONIC DISEASE HOSPITALS

Chronic disease hospitals have not been constructed and used frequently in Tennessee. At the time of the survey there were only ten small chronic and convalescent hospitals with 259 beds. According to the standards 2.0 beds per 1,000 population is permissible.

The regulations state in regard to such hospitals: "Whenever practicable, chronic disease hospitals shall be built in centers of population and in proximity to general hospitals," and "Priority shall be given to those projects in which the chronic disease facilities will be operated as sub-units of general hospitals."

The daily cost for patients in chronic disease hospitals is usually much less than for patients in general hospitals. This lower cost is due to the longer period of stay, lesser needs of medical and surgical facilities and nursing care. However, because of occasional needs for surgical and medical care, patients should be housed in sub-units of a general hospital or in a hospital in close proximity to a general hospital.

E. HEALTH DEPARTMENT FACILITIES

The services of full-time local health departments are needed for every county in the state. Because of the size and economic status of certain counties, grouping of some of the smaller counties into districts will be advantageous. A central office, however, will be needed in each county and several auxiliary offices in centers of population in some of the counties. At the time of the survey, there were 56 central offices and 93 auxiliary offices located in 54 counties. No health departments were in operation in 41 counties. Only 12 buildings used for the central offices were acceptable.

Provision for construction of health centers has been made in the Hospital Survey and Construction Act (Public Law 725, 79th Congress) with the following statement regarding state allowance: "The number of public health centers in a State (counting those existing as well as those provided

with aid under the act) shall not exceed one per 30,000 state population...." The existing facilities determined to be unsuitable shall be excluded. On the basis of the November 1, 1943 population, Tennessee would be permitted 94 health centers in all.

According to recent conception of community needs regarding hospital and health facilities, the health center and the hospital can be housed in the same building. By so doing the health center and the hospital are mutually benefited. Certain facilities such as X-ray equipment, laboratories, other diagnostic aids, etc. can be shared. Also by such planning the cost of construction to the county will be reduced.

In all except those areas with acceptable health centers, the hospital and health center should be combined wherever possible in this new integrated system. The responsibility for provision of health services rests on the county. Also, the county is going to have to make some provision for hospital services. Thus, the utilization of county resources and federal aid in such a program will be advantageous in the development and extension of these services to the public.

F. PERSONNEL

According to data from the Study of Child Health Services of the Tennessee Academy of Pediatrics, there were 1,626 private physicians in active practice in the spring and summer of 1946. In addition to this number of physicians in active private practice there were 56 physicians in local health departments and 267 listed in hospitals. As full-time physicians in small hospitals were not obtained, it is possible that the number of doctors in hospitals should be slightly larger. The number of industrial physicians is not known but is probably small. There are, in addition, physicians on medical school faculties and physicians in administrative positions who are not included. The number of physicians is, therefore, probably around 2,000. This number does not include physicians returning from service after the records for the Study of Child Health Services were completed in the summer of 1946. Based on the estimated population of Tennessee in 1946

of 3,106,289, this number of physicians, 2,000, would give 6.4 physicians per 10,000 population or one physician for 1,600 persons. In 1942, the year of the last American Medical Association directory, there were 13.4 physicians per 10,000 population in the United States. If this is a desirable standard, there would need to be 4,162 physicians in Tennessee and the shortage is slightly over 2,000.

The Study of Child Health Services showed that the metropolitan counties had over twice as many physicians per 10,000 population as had the rest of the population of the state. Thus the deficiency of physicians in the rural area is great. Concentration of physicians in urban areas is due to several factors. A larger income is assured. Greater clinical experience is possible. Also, in the cities there are available all of the medical facilities which will assist physicians in the practice of scientific medicine which is taught in the medical schools of today. The well-qualified physician who has spent six to ten years of his life acquiring technical knowledge and experience in medical schools and hospitals will naturally select for private practice an area with such facilities. Under existing conditions in rural areas, facilities are not usually available and the young physician entering private practice is not able to provide facilities from his own resources. This is believed to be one of the reasons why the newly qualified physicians do not go into private practice in the rural area.

The integrated hospital system planned for under Public Act 725 is intended to provide at public expense hospitals and equipment in which physicians can practice scientific medicine. It is believed that when such a system has been developed, this program will offer to qualified medical personnel the necessary inducement for practice in areas totally lacking such services at present.

A coordinated and integrated system of hospitals will enable small groups of physicians to work together and to provide scientific medical attention in a comparatively wide area. In addition, through consultative professional services by relationship of rural, intermediate and base

hospitals, physicians will receive a continuing medical education and stimulation beneficial to both physicians and patients. Knowledge that consultation service and assistance are available for difficult and unusual cases should be of value to physicians in isolated areas. With the provision of an integrated hospital system and consultation service of specialists, it is possible that medical internships could be established with some of the period spent in rural general hospitals. This integration also makes possible the participation in staff conferences of physicians within regions.

Through the Study of Child Health Services, there were known to be 809 dentists in private practice in Tennessee or 2.6 per 10,000 population. As in the case of physicians, dentists have established their practices in the urban areas. It is felt, however, that if facilities and equipment could be made available in rural hospitals and health centers, dentists would be attracted to rural areas. According to the study of services needed in New York State, 26.9 dentists per 10,000 population would be required. By this standard ten times as many dentists would be needed in Tennessee as are here at present.

The number of registered nurses believed to be in active duty in Tennessee was 3,043, with less than one-third living in the area outside the four large city-counties. The demand for nurses in all fields, such as public health, institutional, industrial and private duty nursing is greater than the supply. In this coordinated hospital and health department system nurses will be needed and opportunities afforded under suitable and adequate surroundings.

G. EDUCATIONAL FACILITIES

In addition to the provision of suitable facilities and opportunities for physicians through this coordinated system of hospitals, the education of sufficient physicians to fill the demand needs consideration. Not only is there a need of perhaps 2,000 physicians to fill the deficiency now existing, but also there should be pro-

vision for education of sufficient physicians to replace the loss due to death, retirement, etc. If 4,000 physicians are required for the population of Tennessee and they practice on the average for thirty years, each year 133 new physicians would be needed. This increase in physicians to fill the deficiency and for replacements will have to come either from medical schools within the state or from other states. Unless facilities in Tennessee are unusually attractive and economic resources relatively high, Tennessee can hardly be expected to depend on other states for physicians. Therefore, Tennessee should plan for the education of sufficient physicians within the state*. There are three existing medical schools, University of Tennessee, Vanderbilt and Meharry. The state-owned school, University of Tennessee, has a great responsibility in the education of physicians for Tennessee and of providing such physicians for the state.

The education of sufficient dentists to supply the demand in Tennessee is also a responsibility of the University of Tennessee. To begin to supply the demand would require an enormous expansion of the dental school.

The training of nurses for health departments and hospitals in order that sufficient registered nurses be available for the future development of hospital and health centers will have to be included as part of the plan. Nursing training schools will have to be established in large general hospitals to be constructed and the schools already existing will have to be expanded.

Only through providing suitable facilities and insuring economic returns will young people be induced to enter these pro-

* A recently adopted plan of the Mississippi State Medical Education Board provides for financial assistance to residents who need funds for medical education. According to the pamphlet "Doctors to Come" students "will sign a State contract to return, upon the completion of one year's internship, to a rural area approved by the State Medical Education Board, there to remain for a minimum period of two years, regardless of amount borrowed. If the student practices medicine in the approved area for five years, his loan is discounted at one-fifth of his total loan per year".

fessions. All these factors will have to be considered in the development of this integrated system.

H. FINANCIAL CONSIDERATION

The intent of the Hospital Survey and Construction Act is to assist the states in providing hospital facilities for all the people. The regulations state: "The state plan shall provide for adequate hospital facilities for the people residing in a state without discrimination on account of race, creed, or color and shall provide for adequate hospital facilities for persons unable to pay therefor." This statement shows the federal intent that the state or sub-units of the state must be responsible for those unable to pay for hospital care. The regulations clarify "those unable to pay" by the statement, "both the legally indigent and persons who are otherwise self-supporting but are unable to pay the full cost of needed hospital care." In considering the relative priority for construction, the regulations state that special consideration will be given "to projects providing service for persons located in rural communities and areas with relatively small financial resources."

Under the federal provision for construction of hospitals, financial aid will be available for hospitals which are not used for profit. According to the regulations a non-profit hospital is "any hospi-

tal owned and operated by a corporation or association, no part of the net earnings of which is applied, or may lawfully be applied, to the benefit of any private shareholder or individual."

As brought out in Section III, B. Financial Resources, county and individual resources as measured by county taxes and effective buying income are limited in some of the counties of Tennessee. In fact, the counties with limited resources are the ones in greatest need of hospitals and health centers. This places a responsibility on the next higher unit of government, the State. It is probable that some of the counties in greatest need will not be able to provide two-thirds of the construction cost which is the requirement for matching the federal funds. Also it is well known that the resources in some areas are not sufficient for hospitals to be self-supporting after erection and that there will be an annual deficit. Consideration of the responsibility of the State for providing some of the cost and for partial maintenance of facilities is a matter for future discussion.

Although some communities have limited resources, others have sufficient resources for construction and maintenance of these facilities. It is believed that these communities will take advantage of the financial aid and the benefits of a coordinated hospital system and of health services.

* * * *

HOSPITAL AND HEALTH DEPARTMENT FACILITIES AND NEEDS IN TENNESSEE

V. THE PLAN FOR HOSPITAL AND HEALTH FACILITIES IN TENNESSEE

The purpose of Public Law 725 of the 79th Congress is to provide federal assistance to the states for establishing "facilities for furnishing adequate hospital, clinic and similar services to all their people." The need for hospital and health facilities in sparsely populated areas and in groups of comparatively low economic status is well known. This need is recognized in the regulations* and is covered in the statement, "In allocating beds under this section, the State Agency shall give special consideration to hospitals serving persons in rural areas and communities with relatively small financial resources."

Congress has authorized the appropriation during the next five years of \$375,000,000 in federal funds for the building of hospitals and health centers. One-third of the cost of construction is to be obtained from federal funds and two-thirds from non-federal funds. The federal allotment for construction in Tennessee for the first year is \$2,673,000. For the five-year period, it is estimated to be \$13,365,000. In order to qualify for funds in this program each state is required to formulate a state plan which is subject to approval of the Surgeon General of the United States Public Health Service. *The Plan for Hospital and Health Facilities in Tennessee* has been developed as a method of providing facilities for the people of Tennessee and of fulfilling requirements for participation in the federal program.

Tennessee Public Acts of 1947, Chapter 16, authorized the Division of Hospital Survey and Construction of the Tennessee Department of Public Health to develop a state plan. Regulations* issued in connection with Public Law 725 have been received for use in the development of such a program.

* Federal Register, Title 42, Public Health.

**The regulations required use of the latest estimated figures for civilian population from the U.S. Department of Commerce. A new release for Tennessee of 2,986,923 for July 1, 1946 has just been received and can be used for the first revision.

The plan as presented in this chapter has been developed utilizing standard terminology and definitions and in accordance with federal regulations. The plan as provided in Public Law 725 is a five-year plan. The law requires that the plan be revised annually.

The estimated population used for the plan was that released by the U. S. Department of Commerce for the civilian population on July 1, 1945 (for Tennessee** 2,832,480). The populations of the counties of Tennessee were estimated using the 1943 release of population based on registrations for War Ration Book Four.

The state-wide survey of existing hospital and health department facilities in 1945 and 1946 has given the number and distribution of hospital beds (Chapter I) and health facilities (Chapter II). In the development of the plan, five types of construction are considered, namely, general hospitals (including allied special hospitals), tuberculosis hospitals, mental hospitals, chronic disease hospitals and health centers. For this grouping of hospitals, the allied special hospitals, namely, one maternity, one for children, five for orthopedic, seven for eye, ear, nose and throat, two for alcoholics and two for venereal disease are included with the general hospitals in considering the distribution of general hospital beds in the state plan. Beds in a general hospital specifically assigned to tuberculosis, mental and chronic disease patients except where the beds so assigned in any institution number less than ten in any category have been counted in the specific category. For example, one general hospital, Uplands Cumberland Mountain Sanatorium, has thirty beds assigned for tuberculosis patients and these have been counted as tuberculosis beds leaving only sixteen general hospital beds. In this chapter the existing beds and the planned beds will be considered for these four types of hospitals. In the planning of the distribution of beds of these four

types, the state has been divided into regions and areas. These divisions of the state and the distribution of general, tuberculosis, mental and chronic disease hospital beds and health department facilities will be subjects of the following seven sections of this chapter. The last section will give the method of administration of the hospital plan.

A. DIVISION OF TENNESSEE INTO REGIONS AND AREAS

In the planning of hospital facilities for a coordinated hospital system, it is necessary to group the counties and develop hospital service areas. The terms, base, intermediate and rural areas*, coordinated hospital system* and regions** as given in the federal regulations have been used and are given below.

"(a) *Area*. A logical hospital service area, taking into account such factors as population distribution, natural geographic boundaries, transportation and trade patterns, all parts of which are reasonably accessible to existing or proposed hospital facilities and which has been designated by the State Agency as a base, intermediate or rural area. Nothing in the regulations in this part shall preclude the formation of an interstate area with the mutual agreement of the states concerned.

"(b) *Base area*. Any area which is so designated by the State Agency and has the following characteristics: (1) Irrespective of the population of the area, it shall contain a teaching hospital of a medical school; this hospital must be suitable for use as a base hospital in a coordinated hospital system within the state; or (2) the area has a total population of at least 100,000 and contains or will contain on completion of the hospital construction program under the State plan at least one general hospital which has a complement of 200 or more beds for general use. This hospital must furnish internships and residences in two or more specialties and must be suit-

able for use as a base hospital in a coordinated hospital system within the State.

"(c) *Intermediate area*. Any area so designated by the State Agency which: (1) Has a total population of at least 25,000 and (2) contains, or will contain on completion of the hospital construction program under the State plan, at least one general hospital which has a complement of 100 or more beds and which would be suitable for use as a district hospital in a coordinated hospital system within the State.

"(d) *Rural area*. Any area so designated by the State Agency which constitutes a unit, no part of which has been included in a base or intermediate area.

"(e) *Coordinated hospital system*. An interrelated network of general hospitals throughout a State in which one or more base hospitals provide district hospitals and the latter in turn provide rural and other small hospitals with such service relative to diagnosis, treatment, medical research and teaching as cannot be provided by the smaller hospitals individually."

"*Region*. A region is a group of two or more areas having hospitals which are or can be closely related for purposes of cooperative effort to provide better hospital care. The group contains one or more intermediate or base areas."

In the development of the plan for a coordinated hospital system and division of the state into regions with base, intermediate and rural areas, many factors were considered. The past, present, and insofar as possible, the future economic picture of each individual county was studied. Among these factors were type and distribution of population, political and geographic boundaries, railroads, highways, available medical personnel including dental and nursing, existing and future plans for health department activities, value of taxable property, effective buying income, use of hospital facilities determined from births and deaths in hospitals by counties, etc.

In preparing the state-wide plan for Tennessee, the three grand divisions of the

* Federal Register, Title 42. Public Health and amendments.

** U.S. Public Health Service, Bureau of States Services, Grants-in-Aid Manual.

state, that is, East, Middle and West Tennessee, received first consideration. The increase in growth of population and industry has had an effect on East Tennessee. The size of the cities of Chattanooga and Knoxville has resulted in East Tennessee having two centers of trade. Thus it seemed advisable to divide East Tennessee into two regions. The state has been divided into four regions which are designated as West, Middle, East-Chattanooga Region, and East-Knoxville Region.

Each of these four regions contains a city of more than 100,000 population. Two of them, West and Middle Tennessee, have cities with large hospitals of medical schools which are suitable for designation as base hospitals in a coordinated hospital system. As Chattanooga and Knoxville have general hospitals of 200 or more beds and furnish internships and residences in two or more specialties, these hospitals are suitable for use as base area hospitals in a coordinated hospital system. Each region has one designated base area. The four base areas indicated by letter and number of the four regions are as follows:

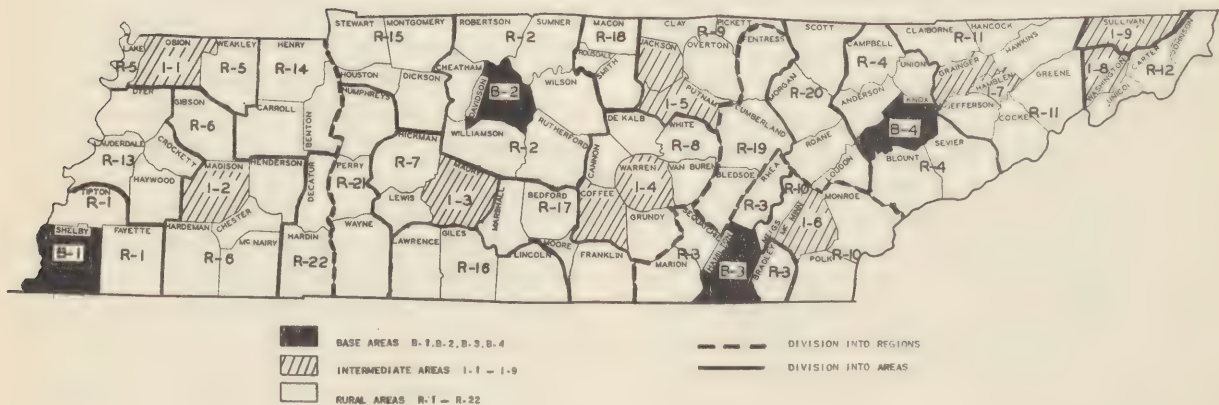
- B-1 - Shelby County(West)
- B-2 - Davidson County(Middle)
- B-3 - Hamilton County . .(East-Chattanooga)
- B-4 - Knox County(East-Knoxville)

In Figure 1 the heavy broken line shows the division of the state into the four regions. The four base areas are in black. These four base areas fulfill all the requirements of the regulations. Within these counties are hospitals with modern equipment and adequate staffs. They maintain departments of research and planning and offer continuous uninterrupted medical service. In the coordinated hospital system, these institutions will be the centers from which will flow consultation, advice and educational activities. To these hospitals will come patients and medical personnel from throughout the particular region to take advantage of the highly specialized equipment and professional training which cannot be supplied in the smaller hospitals.

Nine intermediate areas have been designated for participation in the coordinated hospital system. The regulation that an intermediate area must have a population of not less than 25,000 necessitated the inclusion of two counties in each of three intermediate areas. Effort has been made to distribute these intermediate areas over the state in communities such that these facilities will be readily available for use by the population of rural areas. The

FIGURE 1

BASE, INTERMEDIATE AND RURAL GENERAL HOSPITAL SERVICE AREAS
IN FOUR REGIONS OF TENNESSEE



nine intermediate areas are shown by lining of the counties in Figure 1 and are indicated by number and letter below:

- I-1 - Obion County
- I-2 - Madison County
- I-3 - Maury County
- I-4 - Warren and Coffee Counties
- I-5 - Putnam and Jackson Counties
- I-6 - McMinn County
- I-7 - Hamblen and Grainger Counties
- I-8 - Washington County
- I-9 - Sullivan County

The remainder of the state has been divided into twenty-two rural areas which are inclosed by black lines in Figure 1 and indicated by number and letter. These rural areas are as follows:

- R-1 Fayette, Tipton
- R-2 Cheatham, Robertson, Rutherford, Sumner, Williamson, Wilson
- R-3 Bradley, Marion, Rhea, Sequatchie
- R-4 Anderson, Blount, Campbell, Sevier, Union
- R-5 Lake, Weakley

- R-6 Chester, Gibson, Hardeman, Henderson, McNairy
- R-7 Hickman, Lewis
- R-8 Cannon, DeKalb, Grundy, Van Buren, White
- R-9 Clay, Overton, Pickett
- R-10 Meigs, Monroe, Polk
- R-11 Claiborne, Cocke, Hancock, Hawkins, Jefferson, Greene
- R-12 Carter, Johnson, Unicoi
- R-13 Crockett, Dyer, Haywood, Lauderdale
- R-14 Benton, Carroll, Henry
- R-15 Dickson, Houston, Montgomery, Stewart
- R-16 Giles, Lawrence, Lincoln
- R-17 Bedford, Franklin, Marshall Moore
- R-18 Macon, Smith, Trousdale
- R-19 Bledsoe, Cumberland, Fentress
- R-20 Loudon, Morgan, Roane, Scott
- R-21 Humphreys, Perry, Wayne
- R-22 Decatur, Hardin

For reference, an alphabetical list of counties with type of area (base, intermediate, or rural) and area number is given in Table I.

TABLE I

COUNTIES OF TENNESSEE CLASSIFIED BY AREA

COUNTY	AREA	COUNTY	AREA	COUNTY	AREA	COUNTY	AREA	COUNTY	AREA
ANDERSON	R- 4	DECATUR	R-22	HENDERSON	R- 6	MARION	R- 3	SEQUATCHIE	R- 3
BEDFORD	R-17	DEKALB	R- 8	HENRY	R-14	MARSHALL	R-17	SEVIER	R- 4
BENTON	R-14	DICKSON	R-15	HICKMAN	R- 7	MAURY	I- 3	SHELBY	B- 1
BLEDSON	R-19	DYER	R-13	HOUSTON	R-15	MEIGS	R-10	SMITH	R-18
BLOUNT	R- 4	FAYETTE	R- 1	HUMPHREYS	R-21	MONROE	R-10	STEWART	R-15
BRADLEY	R- 3	FENTRESS	R-19	JACKSON	I- 5	MONTGOMERY	R-15	SULLIVAN	I- 9
CAMPBELL	R- 4	FRANKLIN	R-17	JEFFERSON	R-11	MOORE	R-17	SUMNER	R- 2
CANNON	R- 8	GIBSON	R- 6	JOHNSON	R-12	MORGAN	R-20	TIPTON	R- 1
CARROLL	R-14	GILES	R-16	KNOX	B- 4	OBION	I- 1	TROUSDALE	R-18
CARTER	R-12	GRAINGER	I- 7	LAKE	R- 5	OVERTON	R- 9	UNICOI	R-12
CHEATHAM	R- 2	GREENE	R-11	LAUDERDALE	R-13	PERRY	R-21	UNION	R- 4
CHESTER	R- 6	GRUNDY	R- 8	LAWRENCE	R-16	PICKETT	R- 9	VAN BUREN	R- 8
CLAIBORNE	R-11	HAMBLEN	I- 7	LEWIS	R- 7	POLK	R-10	WARREN	I- 4
CLAY	R- 9	HAMILTON	B- 3	LINCOLN	R-16	PUTNAM	I- 5	WASHINGTON	I- 8
COCKE	R-11	HANCOCK	R-11	LOUDON	R-20	RHEA	R- 3	WAYNE	R-21
COFFEE	I- 4	HARDEMAN	R- 6	MACON	R-18	ROANE	R-20	WEAKLEY	R- 5
CROCKETT	R-13	HARDIN	R-22	MCMINN	I- 6	ROBERTSON	R- 2	WHITE	R- 8
CUMBERLAND	R-19	HAWKINS	R-11	MCMINN	R- 6	RUTHERFORD	R- 2	WILLIAMSON	R- 2
DAVIDSON	B- 2	HAYWOOD	R-13	MADISON	I- 2	SCOTT	R-20	WILSON	R- 2

B. DISTRIBUTION OF GENERAL HOSPITAL BEDS

The location of existing hospitals was obtained through the state-wide survey which was discussed in Chapter I. In Figure 2, the location of the 119 general hospitals is shown with the number of acceptable beds in the communities of Tennessee. There were 6,715 acceptable beds in these general and allied special hospitals.

The maximum allowance for general hospital beds for Tennessee is 4.5 per 1,000

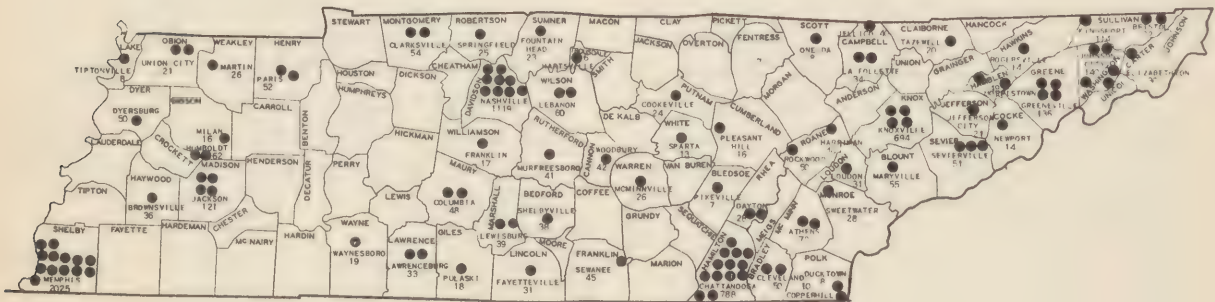
population. The regulations specify the allowances for base, intermediate and rural areas as follows:

Base area 4.5 beds per 1,000 pop.
Intermediate area . 4.0 beds per 1,000 pop.
Rural area. 2.5 beds per 1,000 pop.

These allowances have been used in calculating the number of beds permissible for each area and each county within the area. In calculating beds needed in the three intermediate areas consisting of two

FIGURE 2

LOCATION OF 119 EXISTING ACCEPTABLE GENERAL HOSPITALS (INCLUDING ALLIED SPECIAL HOSPITALS)
WITH 6715 BEDS IN COMMUNITIES OF TENNESSEE



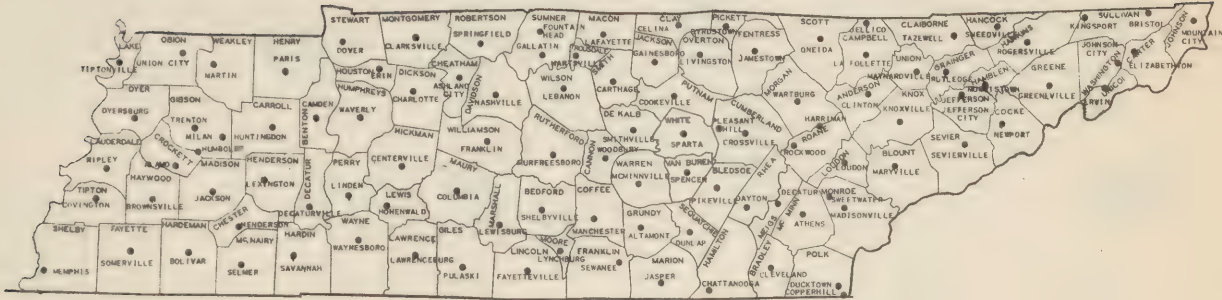
counties, 4.0 beds per 1,000 was used for the intermediate area. One of the two counties would have the intermediate area hospital and for the other county, the need would be 2.5 beds per 1,000 population as in other rural areas. In Figure 3 the communities with existing general hospitals and those in which hospitals are proposed in the Tennessee hospital plan are shown. In this method of assignment beds are allotted or may be built in every county of the state. It is realized that the number of beds necessary to serve the population of some of the counties is small. A building for a community clinic with a few beds and for health department quarters will probably be the type of facility most suitable for such a county.

Of the 13,061 beds* needed for the state, 10,007 were distributed to base, intermediate and rural areas by these allowances of 4.5, 4.0 and 2.5 per 1,000 population. There remain 3,054 beds (13,061-10,007) for the state pool which should be assigned to areas where the need is greater than that calculated from the area ratios prescribed in the regulations. The allotment of these pool beds will be described.

* This number is greater than the number calculated for the state on the rate of 4.5 per 1,000 population due to an excess of 315 acceptable beds in one area. This is according to federal regulations which state "If in any area (base, intermediate, or rural) as determined by the State Agency, there are more beds than required by these standards, such excess may be eliminated in calculating the maximum allowance for the State as a whole." Thus the total permissible is 12,746 plus the 315 excess or 13,061.

FIGURE 3

NAMES AND LOCATION OF CITIES WITH EXISTING AND PLANNED
GENERAL HOSPITAL BEDS



A use of hospital beds which justifies a need greater than that provided by the regulation is for teaching of medical students. Beds in hospitals used for university teaching are at present 997 or 0.35 per 1,000 population. It was believed that these beds should be allotted from the state pool. With some allowance for future expansion of these facilities, 0.4 beds per 1,000 population was used for calculating beds from the pool for teaching (1,133 beds). Considering the proportions of the population of Tennessee, white and colored, 935 were assigned for white and 198 for colored students. At present there are 188 teaching beds at Meharry for colored students and 198 were allotted. For white students, Vanderbilt University in Nashville has 340 beds and University of Tennessee has 489 in John Gaston Hospital. Of the hospital beds used for teaching white students Vanderbilt has 41 per cent and University of Tennessee 59 per cent. Using these percentages, 383 beds were allotted to Vanderbilt and 552 to the University of Tennessee from the pool.

In addition to one area there were four counties in the state in which beds actually constructed exceeded the authorized need based on 2.5 beds per 1,000 population. The excess of 20 beds in Cannon

County, of 48 in Greene, of 12 in Roane and of 2 in Wilson was taken from the pool.

After subtraction of 1,133 pool beds for teaching and 82 for the slight existing excess, there remained 1,839 beds in the pool for distribution or 0.84925 per 1,000 population. It was decided to distribute these beds on a population basis to the hospital community centers of the state. Twenty-three communities of varying size over the state were considered as future hospital centers to be developed in the coordinated hospital system. The names of these communities and the areas that the hospitals would serve are shown in Figure 4. The four base areas and nine intermediate areas are of course expected to serve their own and neighboring counties. In addition, the following ten communities in rural areas have been designated as rural hospital centers:

- Clarksville in Montgomery County
- Crossville in Cumberland County
- Harriman in Roane County
- Hartsville in Trousdale County
- Linden in Perry County
- Paris in Henry County
- Pulaski in Giles County
- Ripley in Lauderdale County
- Savannah in Hardin County
- Shelbyville in Bedford County

FIGURE 4

BOUNDARIES, POPULATION AND HOSPITAL COMMUNITIES OF GENERAL HOSPITAL SERVICE AREAS
(AREA HOSPITAL CENTERS OF 12 RURAL AREAS SURROUNDING BASE OR INTERMEDIATE
AREAS ARE IN BASE OR INTERMEDIATE AREA CENTERS)

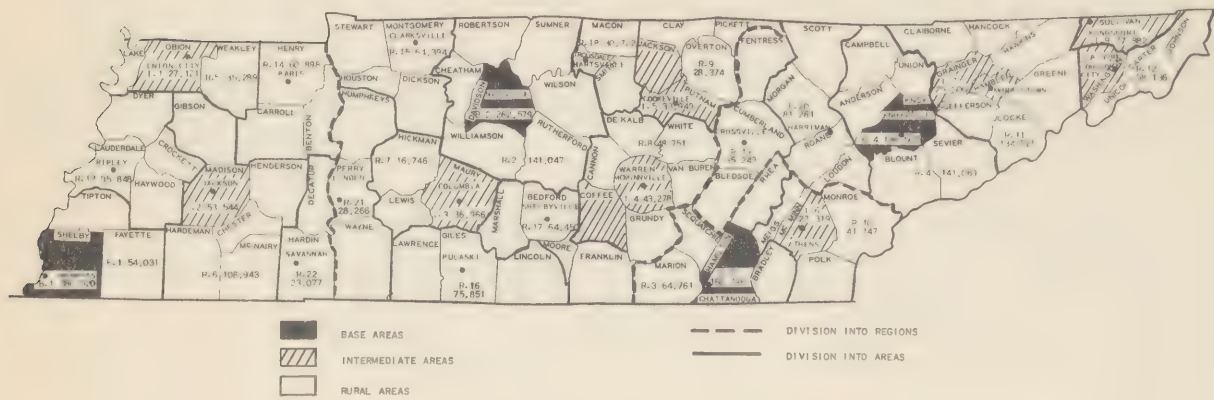


TABLE II

ALLOTMENT OF 3,054 POOL BEDS TO HOSPITAL CENTERS, FOR
TEACHING AND FOR EXISTING NEED

AREA	CENTER OF AREA	POPULATION	ALLOTMENT OF POOL BEDS			
			0.64925 PER 1,000	TEACHING BEDS	EXISTING NEED	TOTAL
TOTAL		2,832,480	1,839	1,133	82	3,054
B- 1, R- 1	MEMPHIS	434,051	282	552	-	834
R-13	RIPLEY	95,848	62	-	-	62
I- 1, R- 5	UNION CITY	62,410	41	-	-	41
R-14	PARIS	60,898	40	-	-	40
I- 2, R- 6	JACKSON	162,487	105	-	-	105
R-22	SAVANNAH	23,077	15	-	-	15
B- 2, R- 2	NASHVILLE	403,626	262	581	2	845
R-15	CLARKSVILLE	64,394	42	-	-	42
R-21	LINDEN	28,266	18	-	-	18
I- 3, R- 7	COLUMBIA	53,712	35	-	-	35
R-16	PULASKI	75,851	49	-	-	49
R-17	SHELBYVILLE	64,450	42	-	-	42
I- 4, R- 8	MCMINNVILLE	92,029	60	-	20	80
R-18	HARTSVILLE	30,722	20	-	-	20
I- 5, R- 9	COOKEVILLE	62,323	40	-	-	40
B- 3, R- 3	CHATTANOOGA	244,937	159	-	-	159
I- 6, R-10	ATHENS	68,466	44	-	-	44
B- 4, R- 4	KNOXVILLE	337,574	219	-	-	219
R-19	CROSSVILLE	35,243	23	-	-	23
R-20	HARRIMAN	81,261	53	-	12	65
I- 7, R-11	MORRISTOWN	164,025	106	-	48	154
I- 8, R-12	JOHNSON CITY	108,948	71	-	-	71
I- 9	SULLIVAN	77,882	51	-	-	51

These ten communities have been selected for establishment of rural hospital centers because of their location and as natural trade centers for surrounding counties. Past and present trends in population and development of industry indicate future growth in size and importance of most of these. Some of them will undoubtedly expand and probably should then be classified as intermediate areas in a revision of the plan. Two, Savannah in Hardin County and Linden in Perry County, were selected for the obvious need of increased hospital facilities in that area.

The areas served by these twenty-three community centers are enclosed by black lines in Figure 4. For example, Memphis would serve as a hospital center for Shelby, Tipton and Fayette Counties and Ripley would serve as a hospital center for Crockett, Dyer, Haywood and Lauderdale Counties. The population of these areas were used in calculating pool beds for the community centers.

The allotment of 3,054 pool beds with 1,839 to these centers, 82 for existing need and 1,133 for teaching hospitals is given in detail in Table II.

TABLE III

EXISTING ACCEPTABLE BEDS, ADDITIONAL BEDS TO BE CONSTRUCTED AND TOTAL BEDS NEEDED IN GENERAL HOSPITALS BY COUNTIES OF TENNESSEE - STATE HOSPITAL PLAN

COUNTY	EXIST- ING AC- CEPTABLE BEDS	ADDI- TIONAL BEDS TO BE CON- STRUCTED	TOTAL BEDS NEEDED	COUNTY	EXIST- ING AC- CEPTABLE BEDS	ADDI- TIONAL BEDS TO BE CON- STRUCTED	TOTAL BEDS NEEDED	COUNTY	EXIST- ING AC- CEPTABLE BEDS	ADDI- TIONAL BEDS TO BE CON- STRUCTED	TOTAL BEDS NEEDED
STATE	6,715	6,346	13,061								
ANDERSON	-	91	91	HAMILTON	788	182	970	MORGAN	-	33	33
BEDFORD	38	59	97	HANCOCK	-	25	25	OBION	21	128	149
BENTON	-	28	28	HARDEMAN	-	55	55	OVERTON	-	39	39
BLED SOE	7	12	19	HARDIN	-	50	50	PERRY	-	33	33
BLOUNT	55	57	112	HAWKINS	14	55	69	PICKETT	-	12	12
BRADLEY	50	19	69	HAYWOOD	36	26	62	POLK	18	16	34
CAMPBELL	74	1	75	HENDERSON	-	41	41	PUTNAM	24	122	146
CANNON	42	-	42	HENRY	52	49	101	RHEA	28	7	35
CARROLL	-	64	64	HICKMAN	-	30	30	ROANE	90	53	143
CARTER	30	54	84	HOUSTON	-	14	14	ROBERTSON	25	32	57
CHEATHAM	-	21	21	HUMPHREYS	-	25	25	RUTHERFORD	41	46	87
CHESTER	-	26	26	JACKSON	-	30	30	SCOTT	8	29	37
CLAIBORNE	20	38	58	JEFFERSON	21	22	43	SEQUATCHIE	-	12	12
CLAY	-	20	20	JOHNSON	-	28	28	SEVIER	51	4	55
COCKE	14	39	53	KNOX	694	409	1,103	SHELBY	2,025	834	2,859
COFFEE	-	64	64	LAKE	8	21	29	SMITH	-	32	32
CROCKETT	-	39	39	LAUDERDALE	-	121	121	STEWART	-	24	24
CUMBERLAND	16	44	60	LAWRENCE	33	32	65	SULLIVAN	136	227	363
DAVIDSON	1,119	906	2,025	LEWIS	-	12	12	SUMNER	23	51	74
DECATUR	-	23	23	LINCOLN	31	30	61	TIPTON	-	68	68
DEKALB	-	29	29	LOUDON	31	24	55	TROUSDALE	6	28	34
DICKSON	-	41	41	MACON	-	31	31	UNICOI	-	33	33
DYER	50	30	80	MC MINN	79	74	153	UNION	-	20	20
FAYETTE	-	67	67	MC NAIRY	-	41	41	VAN BUREN	-	9	9
FENTRESS	-	32	32	MADISON	121	198	319	WARREN	26	143	169
FRANKLIN	45	13	58	MARION	-	46	46	WASHINGTON	140	134	274
GIBSON	78	32	110	MARSHALL	39	-	39	WAYNE	19	11	30
GILES	18	95	113	MAURY	48	135	183	WEAKLEY	26	34	60
GRAINGER	-	29	29	MEIGS	-	12	12	WHITE	13	22	35
GREENE	136	-	136	MONROE	28	28	56	WILLIAMSON	17	39	56
GRUNDY	-	26	26	MONTGOMERY	54	71	125	WILSON	60	-	60
HAMBLIN	49	146	195	MOORE	-	9	9				

With the addition of beds needed according to the formula and allotment of beds from the pool, the total beds needed have been obtained for each county (Table III). The total beds needed have been shown in Table III according to those existing and those to be constructed.

In Table IV the data are presented by area (base, intermediate and rural) and by region to show the number of existing acceptable beds in general hospitals, additional beds to be constructed, total beds needed and percentage of need met. The percentage of need met is obtained by di-

TABLE IV

POPULATION, EXISTING ACCEPTABLE BEDS, ADDITIONAL BEDS TO BE CONSTRUCTED, TOTAL BEDS NEEDED IN GENERAL HOSPITALS AND PERCENTAGE OF NEED MET BY AREAS OF TENNESSEE

REGION AND AREA	POPULATION	EXISTING ACCEPTABLE BEDS	BEDS TO BE CONSTRUCTED	TOTAL BEDS NEEDED	PERCENTAGE OF NEED MET	REGION AND AREA	POPULATION	EXISTING ACCEPTABLE BEDS	BEDS TO BE CONSTRUCTED	TOTAL BEDS NEEDED	PERCENTAGE OF NEED MET
STATE	2,832,480	6,715	6,346	13,061	51.4	MIDDLE					
WEST						R- 17	64,450	122	81	203	60.1
B- 1	380,020	2,025	834	2,859	70.8	R- 18	30,722	6	91	97	6.2
I- 1	27,121	21	128	149	14.1	R- 21	28,266	19	69	88	21.6
I- 2	53,544	121	198	319	37.9	EAST					
R- 1	54,031	0	135	135	-	CHATTANOOGA					
R- 5	35,289	34	55	89	38.2	B- 3	180,176	788	182	970	81.2
R- 6	108,943	78	195	273	28.6	I- 6	27,319	79	74	153	51.6
R- 13	95,848	86	216	302	28.5	R- 3	64,761	78	84	162	48.1
R- 14	60,898	52	141	193	26.9	R- 10	41,147	46	56	102	45.1
R- 22	23,077	0	73	73	-	EAST					
MIDDLE						KNOXVILLE					
B- 2	262,579	1,119	906	2,025	55.3	B- 4	196,505	694	409	1,103	62.9
I- 3	36,966	48	135	183	26.2	I- 7	29,500	49	175	224	21.9
I- 4	43,278	26	207	233	11.2	I- 8	50,812	140	134	274	51.1
I- 5	33,949	24	152	176	13.6	I- 9	77,882	136	227	363	37.5
R- 2	141,047	166	189	355	46.8	R- 4	141,069	180	173	353	51.0
R- 7	16,746	0	42	42	-	R- 11	134,525	205	179	384	53.4
R- 8	48,751	55	86	141	39.0	R- 12	58,136	30	115	145	20.7
R- 9	28,374	0	71	71	-	R- 19	35,243	23	88	111	20.7
R- 15	64,394	54	150	204	26.5	R- 20	81,261	129	139	268	48.1
R- 16	75,851	82	157	239	34.3						

viding the number of existing acceptable beds by the total beds needed and multiplying by 100. For the state, there are 6,715 existing acceptable general hospital beds and 13,061 beds needed, giving 51.4 per cent of the need met.

The areas have been ranked according to percentage of need met and priority groups assigned (Table V). Five groups, A, B, C, D and E, were established. This grouping determines priority of construction. Communities in priority group A will

TABLE V
PRIORITY RANK AND PERCENTAGE OF NEED
MET BY AREAS

PRIOR- ITY	AREA	PERCENT- AGE OF NEED MET	PRIOR- ITY	AREA	PERCENT- AGE OF NEED MET
A	R- 1	0	C	R-16	34.3
A	R-22	0	C	I- 9	37.5
A	R- 7	0	C	I- 2	37.9
A	R- 9	0	C	R- 5	38.2
A	R-18	6.2	C	R- 8	39.0
A	I- 4	11.2	D	R-10	45.1
A	I- 5	13.6	D	R- 2	46.8
A	I- 1	14.1	D	R-20	48.1
			D	R- 3	48.1
B	R-12	20.7	D	R- 4	51.0
B	R-19	20.7	D	I- 8	51.1
B	R-21	21.6	D	I- 6	51.6
B	I- 7	21.9	D	R-11	53.4
B	I- 3	26.2	D	B- 2	55.3
B	R-15	26.5	E	R-17	60.1
B	R-14	26.9	E	B- 4	62.9
B	R-13	28.5	E	B- 1	70.8
B	R- 6	28.6	E	B- 3	81.2

receive consideration before those in other priority groups. This priority grouping has been used so that preference will be given to areas in greatest need. In four areas there were no hospitals and in four others the percentage of need met was less than fifteen per cent. Nine areas in priority group B had between fifteen and thirty per cent of their need met; five had as much as thirty per cent but less than forty-five percent of need met, and nine had as much as forty-five but less than sixty percent of the need met. Four areas with sixty per cent or more of their need met fell in group E, the lowest priority group.

When the Project Construction Schedule is prepared, area priority will be given major consideration in the consideration of individual projects. Normally, projects of lower priority will not be ranked higher than projects in areas of higher priority. However, the order may be altered if other priority principles are of such significance that the project in the area of lower priority is more urgently required and/or more practical of realization in providing

adequate hospital services for the people of the state.

The development of a coordinated general hospital system is one of the described goals of this program. The rural, intermediate and base area hospitals should have a relation one to another in such a hospital system. In Figure 5 the planned integrated coordinated general hospital system is shown. Existing or proposed facilities serving as base, intermediate and rural area hospital centers are indicated by black squares of varying sizes. They are connected by lines indicating the natural flow of patients from rural hospital centers to intermediate area hospital centers and to base area hospital centers. Although the logical plan would be from rural to intermediate, to base hospital, in a few instances the locations of rural centers were such that relation would be from rural to base hospital. Other existing and proposed general hospital centers are indicated by black dots. These centers are connected by broken lines to the hospital center in the area or the most convenient one in an adjacent area.

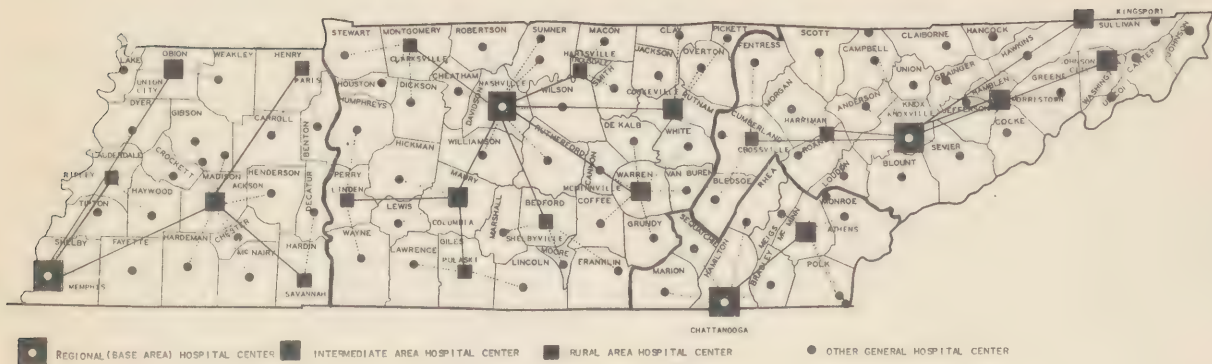
The relationship between regional and area hospital centers and other hospital communities should be of two types. It should be the route of flow of the sick and injured from the smallest community hospital center through the rural and intermediate hospital centers to the base hospital center where all the facilities and equipment will be available. The flow would be reversed in the case of consultations, teaching, staff meetings, supply of equipment and other assistance to be given by the larger hospitals to the smaller. It is hoped that teaching and education will develop in such a coordinated system in the state.

C. DISTRIBUTION OF TUBERCULOSIS HOSPITAL BEDS

For tuberculosis hospital beds the regulations pursuant to Public Law 725 allow 2.5 times the average annual deaths from tuberculosis in the state for the five-

FIGURE 5

RELATIONSHIP BETWEEN REGIONAL AND AREA HOSPITAL CENTERS AND OTHER GENERAL
HOSPITAL COMMUNITIES



year period, 1940-1944. The average annual number of deaths for this period was 2,097 and thus the total needed would be 5,242. In considering the allotment of beds for tuberculosis patients, the value of regional hospitals in the base areas, as planned for general hospitals, was recognized. Also the value of allotting beds for tuberculosis patients for care nearer their homes was appreciated. Thus, two types of hospitals have been planned, regional and sectional hospitals.

Regional tuberculosis hospital centers in Memphis, Nashville, Chattanooga and Knoxville have been planned. These hospitals will be prepared to receive and care for the complicated cases requiring consultation and more technical care and skill. Beds for tuberculosis patients in these regional hospital centers should be in buildings adjacent to or in close proximity to existing hospitals and available for use in teaching medical students and interns.

An allowance of one bed per death* using the average annual number of tubercu-

* An allotment of eight deaths to regions and sections was necessary as the average annual number of recorded deaths was eight greater than the average annual number of deaths of residents of Tennessee.

losis deaths in the region during the five-year period, 1940-1944, was assigned for the regional hospital. On this basis, 2,097 beds were planned for regional hospitals with 658 in West Tennessee, 721 in Middle Tennessee, 266 for Chattanooga region of East Tennessee and 452 for Knoxville region of East Tennessee.

For provision of beds for tuberculosis patients near their homes, the areas of each region have been grouped into sections. The center of each section was the center of a base or intermediate area. By this division there are three sections in West Tennessee with centers in Memphis, Union City and Jackson; four sections in Middle Tennessee with centers in Nashville, Columbia, McMinnville and Cookeville; two in the Chattanooga region of East Tennessee in Chattanooga and Athens and four in the Knoxville region of East Tennessee in Knoxville, Morristown, Johnson City and Kingsport.

An allowance of 1.5 beds per death using the average annual number of tuberculosis deaths in the section during the five-year period, 1940-1944 was assigned for the sectional hospitals. On this basis, 3,145 beds were planned for the 13 section-

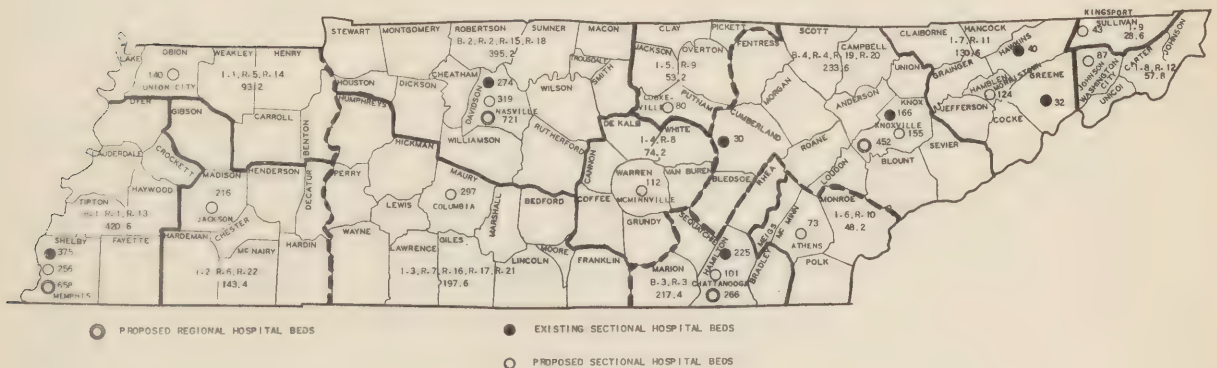
TABLE VI

EXISTING ACCEPTABLE BEDS, ADDITIONAL BEDS TO BE CONSTRUCTED AND
TOTAL BEDS NEEDED FOR TUBERCULOSIS BY REGIONS AND SECTIONS OF TENNESSEE

REGION	SECTION	HOSPITAL CENTER	EXISTING ACCEPTABLE BEDS	BEDS TO BE CONSTRUCTED	TOTAL BEDS NEEDED
STATE			1,142	4,100	5,242
REGIONAL HOSPITALS			-	2,097	2,097
WEST TENNESSEE		MEMPHIS	-	658	658
MIDDLE TENNESSEE		NASHVILLE	-	721	721
EAST TENNESSEE - CHATTANOOGA		CHATTANOOGA	-	266	266
EAST TENNESSEE - KNOXVILLE		KNOXVILLE	-	452	452
SECTIONAL HOSPITALS			1,142	2,003	3,145
WEST TENNESSEE	B-1, R-1, R-13	MEMPHIS	375	256	631
WEST TENNESSEE	I-1, R-5, R-14	UNION CITY	-	140	140
WEST TENNESSEE	I-2, R-6, R-22	JACKSON	-	216	216
MIDDLE TENNESSEE	B-2, R-2, R-15, R-18	NASHVILLE	274	319	593
MIDDLE TENNESSEE	I-3, R-7, R-16, R-17, R-21	COLUMBIA	-	297	297
MIDDLE TENNESSEE	I-4, R-8	MCMINNVILLE	-	112	112
MIDDLE TENNESSEE	I-5, R-9	CROSSVILLE	-	80	80
EAST TENNESSEE - CHATTANOOGA	R-3, R-3	CHATTANOOGA	225	101	326
EAST TENNESSEE - CHATTANOOGA	I-6, R-10	ATHENS	-	73	73
EAST TENNESSEE - KNOXVILLE	B-4, R-4, R-19, R-20	KNOXVILLE	196	155	351
EAST TENNESSEE - KNOXVILLE	I-7, R-11	MORRISTOWN	72	124	196
EAST TENNESSEE - KNOXVILLE	I-8, R-12	JOHNSON CITY	-	87	87
EAST TENNESSEE - KNOXVILLE	I-9	KINGSPORT	-	43	43

FIGURE 6

EXISTING AND PLANNED TUBERCULOSIS HOSPITAL BEDS AND AVERAGE ANNUAL NUMBERS OF
TUBERCULOSIS DEATHS, 1940-1944, OF 13 SECTIONS OF TENNESSEE



al hospitals. It is contemplated that these sectional tuberculosis hospital beds will be constructed as tuberculosis units of the existing or planned general hospitals in the hospital community centers. The existing and proposed tuberculosis beds in regional and sectional hospitals are given in Table VI and are shown in Figure 6.

The existing and proposed beds for tuberculosis have been summarized for the

four regions and the percentage of the need met calculated for the regions (Table VII). For the state as a whole only 21.8 per cent of the need for tuberculosis beds has been met. By regions the percentage of need met was lowest for Middle Tennessee. No account has been taken here of the construction of tuberculosis beds now in progress. Tuberculosis hospitals which should be classified as regional hospitals are now being planned and constructed.

TABLE VII

EXISTING ACCEPTABLE BEDS, BEDS TO BE CONSTRUCTED, TOTAL BEDS NEEDED FOR TUBERCULOSIS, AND PERCENTAGE OF NEED MET FOR FOUR REGIONS OF TENNESSEE

REGION	EXISTING ACCEPTABLE BEDS	BEDS TO BE CON- STRUCTED	TOTAL BEDS NEEDED	PERCENTAGE OF NEED MET
STATE	1,142	4,100	5,242	21.8
MIDDLE TENNESSEE	274	1,529	1,803	15.2
WEST TENNESSEE	375	1,270	1,645	22.8
EAST TENNESSEE - KNOXVILLE	268	861	1,129	23.7
EAST TENNESSEE - CHATTANOOGA	225	440	665	33.8

D. DISTRIBUTION OF MENTAL HOSPITAL BEDS

The regulations permit five beds per 1,000 population for mental patients. On the basis of the 1945 population, this would give 14,162 beds needed for patients with mental disease. Nearly all of the existing beds for mental patients are in the three large state-owned mental hospitals in West, Middle and East Tennessee (6,308 of the 6,808 existing beds). Thus the available beds have been established on a regional basis.

In planning the distribution of mental hospital beds it was decided to distribute the major proportion of the beds to the regions and 4.0 beds per 1,000 population have been distributed on the regional basis. In regional hospitals, 11,330 beds would be needed, of which 6,308 exist and 5,022 are proposed for construction. These regional hospitals should have complete facilities in which to care for patients suffering from all types of mental illness. They

should provide for early diagnosis and for intensive treatment for mental patients and should have out-patient facilities. The location of these regional mental hospitals should be in the base area hospital centers. This is in accordance with the regulations which state as follows: "Whenever practicable, mental hospitals receiving grants under the Federal Act shall be located in centers of population and in proximity to general hospitals."

In addition to beds for mental patients in the base areas on a regional basis, some of the beds should be constructed nearer the patients' homes. The division of the state into thirteen sections as outlined in the discussion of tuberculosis and allotment of 1.0 beds per 1,000 population to the sections was considered a suitable method for distribution of mental beds. These beds should be in psychopathic hospitals or in psychopathic pavilions in connection with existing or planned general hospitals in the general hospital centers

TABLE VIII

EXISTING ACCEPTABLE BEDS, ADDITIONAL BEDS TO BE CONSTRUCTED, AND TOTAL BEDS NEEDED FOR MENTAL DISEASES BY REGIONS AND SECTIONS OF TENNESSEE

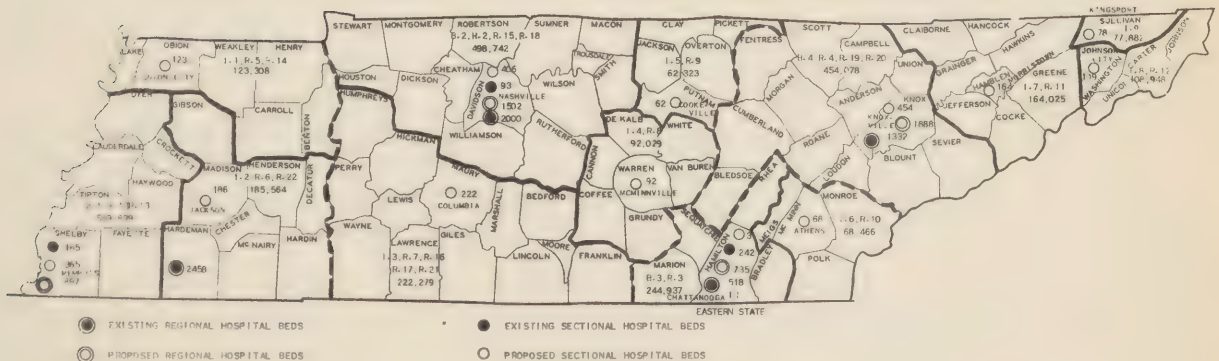
REGION	SECTION	HOSPITAL CENTER	EXISTING ACCEPTABLE BEDS	BEDS TO BE CONSTRUCTED	TOTAL BEDS NEEDED
STATE			6,808	7,354	14,162
REGIONAL HOSPITALS			6,308	5,022	11,330
WEST TENNESSEE		MEMPHIS	2,458*	897	3,355
MIDDLE TENNESSEE		NASHVILLE	2,000	1,502	3,502
EAST TENNESSEE - CHATTANOOGA		CHATTANOOGA	518**	735	1,253
EAST TENNESSEE - KNOXVILLE		KNOXVILLE	1,332**	1,888	3,220
SECTIONAL HOSPITALS			500	2,332	2,832
WEST TENNESSEE	B-1, R-1, R-13	MEMPHIS	165	365	530
WEST TENNESSEE	I-1, R-5, R-14	UNION CITY	-	123	123
WEST TENNESSEE	I-2, R-6, R-22	JACKSON	-	186	186
MIDDLE TENNESSEE	R-2, R-2, R-15, R-18	NASHVILLE	93	406	499
MIDDLE TENNESSEE	I-3, R-7, R-16, R-17, R-21	COLUMBIA	-	222	222
MIDDLE TENNESSEE	I-4, R-8	MC MINNVILLE	-	92	92
MIDDLE TENNESSEE	I-5, R-9	COOKEVILLE	-	62	62
EAST TENNESSEE - CHATTANOOGA	B-3, R-3	CHATTANOOGA	242	3	245
EAST TENNESSEE - CHATTANOOGA	I-6, R-10	ATHENS	-	68	68
EAST TENNESSEE - KNOXVILLE	B-4, R-4, R-19, R-20	KNOXVILLE	-	454	454
EAST TENNESSEE - KNOXVILLE	I-7, R-11	MORRISTOWN	-	164	164
EAST TENNESSEE - KNOXVILLE	I-8, R-12	JOHNSON CITY	-	109	109
EAST TENNESSEE - KNOXVILLE	I-9	KINGSPORT	-	78	78

* Western State in Hardeman County

** Eastern State in Knoxville

FIGURE 7

EXISTING AND PLANNED MENTAL HOSPITAL BEDS AND POPULATIONS OF 13 SECTIONS OF TENNESSEE



of the base and intermediate areas. By such an arrangement the proper and early treatment of mental patients is provided in hospitals to which the stigma of the mental institution is not attached. Under this method of distribution, 2,832 beds for mental patients were allotted to the thirteen hospital centers. The existing and proposed beds in regional and sectional hospitals for mental patients are given in Table VIII and are shown in Figure 7.

The existing and proposed beds for mental patients have been summarized for the four regions and the percentage of the need met calculated for the regions. The regions are given in Table IX in rank of percentage of need met.

For the state, 48.1 per cent of the need for beds for mental patients has been met. The percentages by regions varied from 33.1 per cent for East Tennessee to 62.5 per cent for West Tennessee

TABLE IX

EXISTING ACCEPTABLE BEDS, BEDS TO BE CONSTRUCTED, TOTAL BEDS NEEDED AND PERCENTAGE OF NEED MET FOR MENTAL DISEASES FOR FOUR REGIONS OF TENNESSEE

REGION	EXISTING ACCEPTABLE BEDS	BEDS TO BE CON- STRUCTED	TOTAL BEDS NEEDED	PERCENTAGE OF NEED MET
STATE	6,808	7,354	14,162	48.1
EAST TENNESSEE - KNOXVILLE	1,332	2,693	4,025	33.1
MIDDLE TENNESSEE	2,093	2,284	4,377	47.8
EAST TENNESSEE - CHATTANOOGA	760	806	1,566	48.5
WEST TENNESSEE	2,623	1,571	4,194	62.5

E. DISTRIBUTION OF CHRONIC DISEASE HOSPITAL BEDS

The authorized allowance for chronic disease beds for the state is 2.0 per 1,000 population. This allowance gives 5,665 beds. According to the state-wide survey there were 247 existing beds for chronic disease patients. In considering the allotment of the beds for chronic disease patients, nearly all the beds should be available near the homes of the patients. These patients will often remain in the hospitals for a long period of time and some will be there for terminal care. Thus 1.5 beds per 1,000 population or 4,247 beds have been allotted to the sectional hospitals. These should be constructed adjacent

to or as wards of the general hospitals.

As regional hospitals in the base areas are also necessary for specialized surgical and medical observation and treatment of patients with chronic diseases. 0.5 beds per 1,000 population or 1,418 beds have been allotted to these areas.

The distribution of existing and proposed beds for chronic disease patients in regional and sectional hospitals are given in Table X and are shown in Figure 8.

The existing and proposed beds for chronic disease patients are given in Table XI for the four regions of Tennessee. The percentages of need met are low for all four regions.

TABLE X

EXISTING ACCEPTABLE BEDS, ADDITIONAL BEDS TO BE CONSTRUCTED AND TOTAL BEDS
NEEDED FOR CHRONIC DISEASES, BY REGIONS AND SECTIONS OF TENNESSEE

REGION	SECTION	HOSPITAL CENTER	EXISTING ACCEPTABLE BEDS	BEDS TO BE CON- STRUCTED	TOTAL BEDS NEEDED
STATE			247	5,418	5,665
REGIONAL HOSPITALS			-	1,418	1,418
WEST TENNESSEE		MEMPHIS	-	419	419
MIDDLE TENNESSEE		NASHVILLE	-	439	439
EAST TENNESSEE - CHATTANOOGA		CHATTANOOGA	-	157	157
EAST TENNESSEE - KNOXVILLE		KNOXVILLE	-	403	403
SECTIONAL HOSPITALS			247	4,000	4,247
WEST TENNESSEE	B-1, R-1, R-13	MEMPHIS	123	672	795
WEST TENNESSEE	I-1, R-5, R-14	UNION CITY	-	185	185
WEST TENNESSEE	I-2, R-6, R-22	JACKSON	-	278	278
MIDDLE TENNESSEE	B-2, R-2, R-15, R-18	NASHVILLE	111	637	748
MIDDLE TENNESSEE	I-3, R-7, R-16, R-17, R-21	COLUMBIA	-	333	333
MIDDLE TENNESSEE	I-4, R-8	MCMINNVILLE	-	138	138
MIDDLE TENNESSEE	I-5, R-9	COOKEVILLE	-	93	93
EAST TENNESSEE - CHATTANOOGA	B-3, R-3	CHATTANOOGA	13	354	367
EAST TENNESSEE - CHATTANOOGA	I-6, R-10	ATHENS	-	103	103
EAST TENNESSEE - KNOXVILLE	B-4, R-4, R-19, R-20	KNOXVILLE	-	681	681
EAST TENNESSEE - KNOXVILLE	I-7, R-11	MORRISTOWN	-	246	246
EAST TENNESSEE - KNOXVILLE	I-8, R-12	JOHNSON CITY	-	163	163
EAST TENNESSEE - KNOXVILLE	I-9	KINGSFORT	-	117	117

FIGURE 8

EXISTING AND PLANNED CHRONIC DISEASE HOSPITAL BEDS AND POPULATIONS
OF 13 SECTIONS OF TENNESSEE

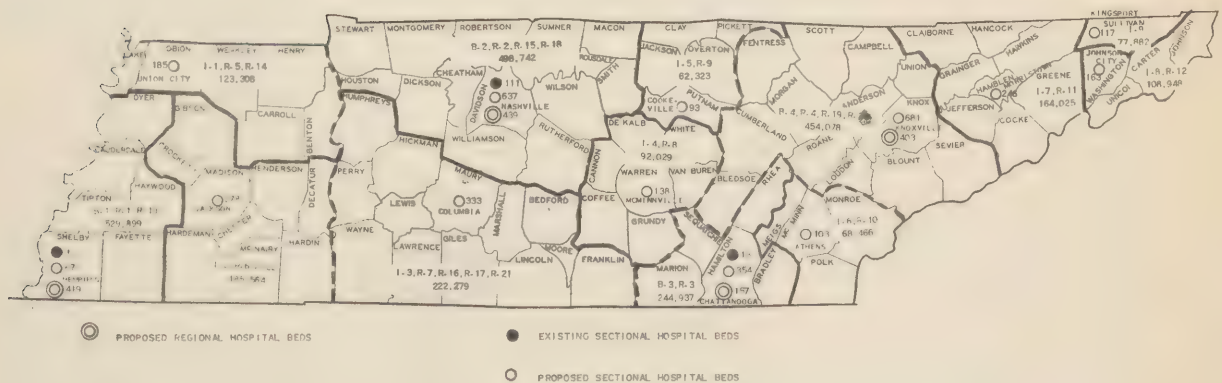


TABLE XI

EXISTING ACCEPTABLE BEDS, BEDS TO BE CONSTRUCTED, TOTAL BEDS NEEDED AND
PERCENTAGE OF NEED MET FOR CHRONIC DISEASES FOR FOUR REGIONS OF TENNESSEE

REGION	EXISTING ACCEPTABLE BEDS	BEDS TO BE CON- STRUCTED	TOTAL BEDS NEEDED	PERCENTAGE OF NEED MET
STATE	247	5,418	5,665	4.4
EAST TENNESSEE - KNOXVILLE	-	1,610	1,610	0.0
EAST TENNESSEE - CHATTANOOGA	13	614	627	2.1
MIDDLE TENNESSEE	111	1,640	1,751	6.3
WEST TENNESSEE	123	1,554	1,677	7.3

F. SUMMARY OF HOSPITAL BEDS NEEDED

A summary of the existing and proposed beds in hospitals for the four categories (general, tuberculosis, mental and chronic) is presented in Table XII.

For the state, 38,130 beds are needed in hospitals for care of patients according to the standards recommended in accordance

with Public Law 725. From data obtained in the state-wide survey of existing facilities there were 14,912 existing acceptable beds in Tennessee at the time of the survey, or 39.1 per cent of the needed beds in the state existed at the time of the survey. It is realized that not all beds considered acceptable will be found to be acceptable according to standards when an inspection has been made. Thus far inspections have

TABLE XII

EXISTING ACCEPTABLE BEDS, BEDS TO BE CONSTRUCTED, TOTAL BEDS NEEDED AND
PERCENTAGE OF NEED MET FOR FOUR CATEGORIES OF HOSPITALS FOR TENNESSEE

CATEGORY	EXISTING ACCEPTABLE BEDS	BEDS TO BE CON- STRUCTED	TOTAL BEDS NEEDED	PERCENTAGE OF NEED MET
STATE	14,912	23,218	38,130	39.1
GENERAL HOSPITALS	6,715	6,346	13,061	51.4
TUBERCULOSIS	1,142	4,100	5,242	21.8
MENTAL DISEASE	6,808	7,354	14,162	48.1
CHRONIC DISEASE	247	5,418	5,665	4.4

not been made and all beds are used as acceptable until declared not satisfactory under Tennessee standards of construction and maintenance.

At this time, only 175 beds in one hospital have been found to be non-acceptable and thus they were not used.

In determining priority of construction, a fair and just balance between the

four categories, general, tuberculosis, mental and chronic, must be maintained.

G. DISTRIBUTION OF HEALTH FACILITIES

The law provides for the construction of public health centers as well as hospitals. At the rate of one health center per 30,000 population, 94 health centers are permissible. It is the aim to have a health

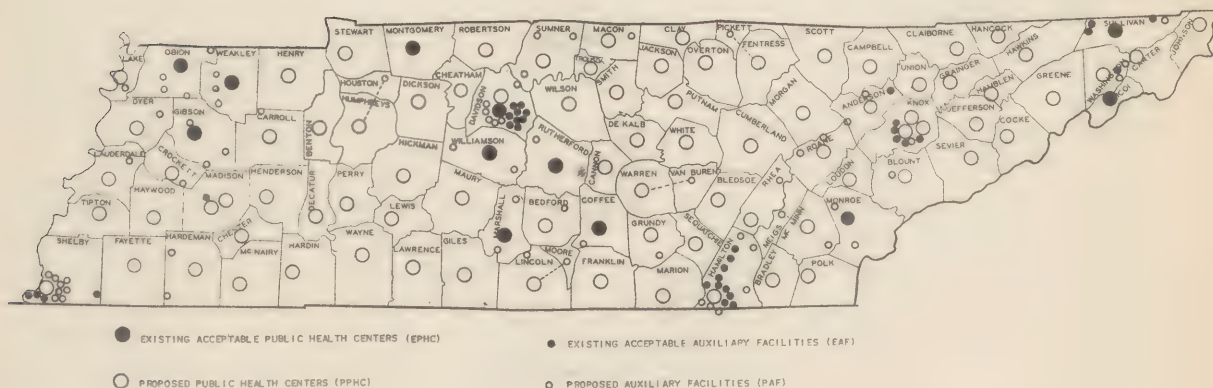
center in all of the 95 counties of the state. The two regional offices, one in Jackson for West Tennessee and one in Knoxville for East Tennessee, are in need of suitable housing accommodations. Two cities, Nashville in Davidson County and Knoxville in Knox County, have central offices which are separate from the county health centers. In all, 99 health centers are needed, 12 are existing and acceptable, which leaves 87 to be constructed. As only 82 (94 authorized minus the 12 acceptable) can be planned for construction at the present time, consideration of five county centers will be postponed until possible through revision of the plan. (The estimated population for Tennessee for July 1, 1946 was 2,986,923 and utilizing the formula, 99 health centers would be permissible. This new estimate of population from the Bureau of the Census was received too late to be used in this plan.)

These public health centers may be constructed as separate buildings or as part of the hospital construction in any area. Many advantages result in locating the health center in the same building with the hospital. A saving of equipment, construction cost and maintenance would be possible for a county needing both. Laboratory facilities would be used for both services. In small rural counties needing only a few beds, the combination of these beds with the health center seems especially desirable if not the only practical method of providing both services. The existing and proposed public health centers are shown in Figure 9.

In many of the counties with full-time health services, the establishment of auxiliary facilities has been found to be necessary for extension of services to the communities. In Figure 9, these existing

FIGURE 9

EXISTING ACCEPTABLE AND PROPOSED PUBLIC HEALTH CENTERS
AND AUXILIARY FACILITIES



auxiliary facilities which are acceptable and those not acceptable which are proposed for construction are also shown. With addition of health centers in counties without full-time health service at present, the number of auxiliary facilities is expected to increase.

The priority of public health center projects is to be determined by the Tennes-

see Department of Public Health at the time construction of hospital projects is being considered, giving due regard to the regulations.

H. METHOD OF ADMINISTRATION

The Tennessee Department of Public Health has been designated by Legislative Act as the agency to administer the plan

with the Division of Hospital Survey and Construction in charge within the Department. The state plan was approved unanimously by the Hospital Advisory Committee. The regulations provide for annual revisions of the plan. On or before May 15 of each year a report, containing revisions, is to be sent to the Surgeon General of the United States Public Health Service.

For administration of the plan, information regarding procedures to be followed by a community to secure federal funds is to be released. Applications of those desiring to participate in the program in the receipt of federal funds will be submitted to the Tennessee Department of Public Health.

The requirements for acceptability of applications include the following:

a. The applicant will assure the availability of funds for maintenance and operation for first two years with submission of data as required. Government ownership will be accepted as satisfying this requirement.

b. The applicant will conform to the requirement of the regulations, regarding the provision of facilities by including the following statement, "The applicant hereby assures the State Department of Public Health that no person in the area will be denied admission as a patient to the facility on account of race, creed or color."

c. The applicant will conform to the minimum standards for operation and maintenance of hospitals (Licensing Law and Standards for Hospitals of Tennessee) and the regulations (General Regulations for Hospitals of Tennessee).

d. Construction under Public Law 725 includes (1) construction of new buildings, (2) expansion, remodeling and alteration of existing buildings and (3) initial equipment of any such new or existing buildings, including architects' fees.

e. Construction standards as given in the appendix and amendments thereto of regulations entitled, General Stand-

ards of Construction and Equipment, of the Surgeon General (Federal Register, Title 42, Public Health) will be followed.

After receipt of applications, a project construction schedule will be developed. A project will be placed on this schedule with consideration of the following four factors:

1. The priority of the project in accordance with the rank obtained based on relative need.

2. The intent of the sponsoring agency to begin construction within a reasonable length of time.

3. The ability of the sponsoring agency to meet the financial requirements for construction, maintenance and operation.

4. The maintenance of an appropriate balance in the construction of the various categories of facilities (i.e. general, tuberculosis, mental and chronic disease hospitals) and public health centers.

The method of payment of federal funds is similar to that used by the federal government for assisting states in the construction of highways. An explanation of the procedures is given in a release, "The Contractual Obligation Technique Under the Hospital Survey and Construction Act."

The federal regulations provide for fair hearings for every applicant who requests federal aid in hospital construction and is dissatisfied with the action of the Tennessee Department of Public Health. For such hearings, 15 days after denial of the opportunity to make formal application, rejection or disapproval of application, or refusal to consider an application, appeal must be made in writing to the Tennessee Department of Public Health. Procedures under which such hearings will be conducted have been established.

The Tennessee Department of Public Health accepts the responsibility of complying with the federal regulations in regard to procedures, fiscal and accounting requirements, personnel, standards, etc.

SUMMARY

In accordance with federal regulations pursuant to Public Law 725 and with Tennessee Public Acts of 1947, a plan for hospital and health facilities in Tennessee has been developed.

A coordinated hospital system with the division of the state into regions, and base, intermediate and rural areas has been planned so that the best and most modern facilities will be available for the entire population.

The location of the 6,715 existing acceptable beds in general hospitals (including allied special hospitals) and the 6,346 proposed additional beds to be constructed is shown. In all, 13,061 beds are needed in general hospitals and 51.4 per cent of the need is met by existing facilities.

The percentage of the need met for tuberculosis hospital beds was low, 21.8. Beds for tuberculosis patients in regional and sectional hospitals are recommended.

Beds for mental patients in regional hospitals and also in psychopathic wards and pavilions of general hospitals in the sections are proposed. Of the 14,162 beds needed for mental patients, 6,808 exist at present (48.1 per cent).

Beds for patients with chronic diseases are needed in the sectional hospitals near patients' homes and also in the large regional hospital centers. There are at present only 247 of the proposed 5,665 beds for chronic disease patients (4.4 per cent).

Although health centers are needed in all counties of Tennessee, there were only 12 acceptable buildings. It will be the policy to have construction of health centers in conjunction with general hospitals wherever feasible.

A method of administration of the five-year program has been outlined. After applications are received, the project construction schedule considering priority based on relative need and the requirements of the regulations and other factors will be developed and followed.

* * * * *

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